6523.0 - Household Income and Income Distribution, Australia, 2002-03

Summary

Main Features

ABOUT THIS PUBLICATION

This publication presents the income and characteristics of households and persons resident in private dwellings in Australia, compiled from the 2002-03 Survey of Income and Housing (SIH). These statistics are compared with results from each of the previous survey cycles from 1994-95.

CHANGES IN THIS ISSUE

The changes included with this issue are:

- a larger sample of 19,400 persons for 2002-03 compared with 13,200 for the 2000-01 survey
- a new table 2 which shows the income ranges for households and persons
- the inclusion of the numbers of persons with zero or negative incomes in tabulations by principal source of income
- the "average number of earners in the household" data item reported in previous issues of this publication has been replaced in this issue with the data item "average number of employed persons". "Earners" excluded both dependent children with wage and salary income, and contributing family workers i.e., persons working without pay in economic enterprises operated by relatives. "Employed persons" includes all persons in the household with a labour force status of "employed"
- in addition to the number of employed persons, the household characteristics presented in the tables now also includes the average number of dependent children in the household
- in Appendix 1, a comparison between the Gini coefficient and some alternative summary measures (the Theil index and the Atkinson index).

EFFECTS OF ROUNDING

All figures have been rounded, and discrepancies may occur between sums of the component items and totals, and between the percentages as presented and those that could be calculated from the rounded figures.

INQUIRIES

For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070 or Jan Gatenby on Canberra (02) 6252 6627.

SUMMARY COMMENTARY

SUMMARY OF FINDINGS

INTRODUCTION

The economic wellbeing of individuals is largely determined by their command over economic resources. People's income and reserves of wealth provide access to many of the goods and services consumed in daily life. This publication provides indicators of the level and distribution of after tax (disposable) household cash income, after adjusting for household size and composition.

The estimates of disposable income in this publication are derived from the gross cash income data collected in the Survey of Income and Housing (SIH), after deducting estimates of income tax liability and the Medicare levy. Gross cash income is defined as regular and recurring cash receipts from wages and salaries, profit/loss from own unincorporated business, investment income in the form of interest, rent and dividends, private transfers in the form of superannuation, child support, other transfers from other households, and cash transfers from government pensions and allowances. The restriction to cash incomes is one of practical measurement and is assessed to provide a reasonable, broad picture of the level and distribution of income. However, readers are advised that the relative mix of cash and non-cash incomes across subpopulations will be different, and can change over time.

While income is usually received by individuals, it is normally shared between partners in a couple relationship and with dependent children. To a lesser degree, there may be sharing with other members of the household. Even when there is no transfer of income between members of a household, nor provision of free or cheap accommodation, members are still likely to benefit from the economies of scale that arise from the sharing of dwellings. The income measures shown in this publication therefore relate to household income. However, larger households normally require a greater level of income to maintain the same material standard of living as smaller households, and the needs of adults are normally greater than the needs of children. The income estimates are therefore adjusted by equivalence factors to standardise the income estimates with respect to household size and composition while taking into account the economies of scale that arise from the sharing of dwellings. The equivalised disposable income estimate for any household in this publication is expressed as the amount of disposable cash income that a single person household would require to maintain the same standard of living as the household in question, regardless of the size or composition of the latter.

Appendix 3 provides a more detailed explanation of equivalised disposable household income. It shows the differences in income measures when calculated from data at different stages in progression from gross household income, through disposable household income,
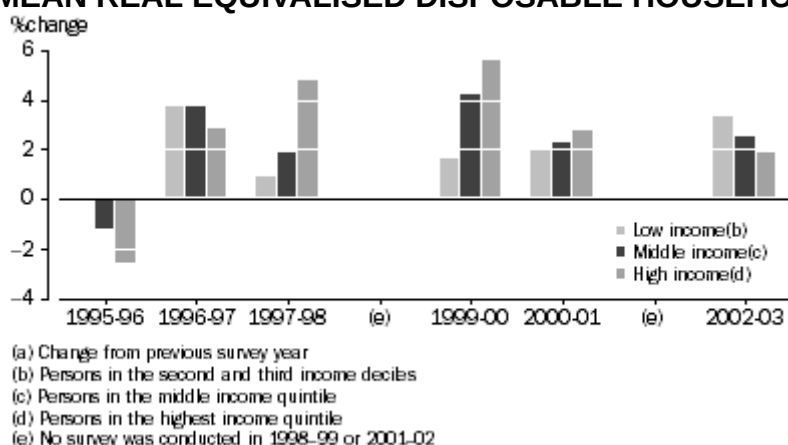
to person weighted equivalised disposable household income.

HOUSEHOLD INCOME

In 2002-03, average (mean) equivalised disposable household income for all persons living in private dwellings (i.e., the income that a single person household would require to maintain the same standard of living as the average person living in all private dwellings in Australia) was $510 per week (table 1). There were approximately 19.3 million people living in these dwellings.

In real terms, average equivalised disposable household income in 2002-03 was 2% higher than in 2000-01 ($498) and 15% higher than in 1994-95 ($445). Between 2000-01 and 2002-03, real mean income for low income people (i.e. the 20% of people with household income between the bottom 10% and bottom 30% of incomes) grew by 4%, compared to 2% for both middle income people and high income people. Over the period from 1994-95, there was a 12% increase in the real mean income of low income people, 14% for middle income people and 16% for high income people.

CHANGES IN MEAN REAL EQUIVALISED DISPOSABLE HOUSEHOLD INCOME (a)

(a) Change from previous survey year
(b) Persons in the second and third income deciles
(c) Persons in the middle income quintile
(d) Persons in the highest income quintile
(e) No survey was conducted in 1998–99 or 2001-02

Household characteristics

Households with different income levels tend to differ with respect to other characteristics, as shown in table 6 and summarised in the following table. Wages and salaries were the principal source of income for households with middle and high income levels in 2002-03, while government pensions and allowances dominated for low income households. However, low income households had the highest incidence of full ownership of their home, reflecting the high proportion of elderly people in the low income category.

Household characteristics 2002-03, By income group

		Low income(a)	Middle income(b)	High income(c)
Mean equivalised disposable household income per week	$	269	449	975
Has PSI of wages and salaries(d)	%	20.7	73.7	85.8
Has PSI of government pensions and allowances(d)	%	70.1	7.0	-
Owns home without a mortgage	%	49.3	34.3	26.9
Owns home with a mortgage	%	15.3	38.1	48.3

Rents from state/territory housing authority	%	8.4	2.7	*0.2
Rents from private landlord	%	22.2	22.3	21.9
Average number of persons in the household	no.	2.3	2.8	2.4
Average number of employed persons in the household	no.	0.5	1.4	1.9

* estimate has a relative standard error of 25% to 50% and should be used with caution
- nil or rounded to zero (including null cells)
(a) Persons in the second and third income deciles
(b) Persons in the middle income quintile
(c) Persons in the highest income quintile
(d) Principal source of income

Middle income households contained more people on average than high income households (2.8 compared to 2.4) but contained considerably fewer employed persons (1.4 compared to 1.9). In part, this reflects the different age profiles of the two groups. Table 6 shows that middle income households (shown as the third quintile) had an average of 0.8 persons under the age of 18 and 0.2 aged 65 and over, compared to 0.3 and 0.1 respectively for high income households. Low income households had an average of 0.5 employed persons, and housed an average of 2.3 persons. Of these, 1.1 were 18 to 64 years, with 0.6 under 18 years and 0.6 persons aged 65 years and over.

The characteristics of Australian households are changing over time. Table 3 shows that the average number of persons per household declined from 2.69 to 2.53, or about 6%, between 1994-95 and 2002-03, with over half the decline being in the under 18 age group. There was also a fall in the proportion of households containing couple families. In contrast, the proportion of lone person households and of households comprising one parent with dependent children both increased. Each principal source of income retained its relative importance between 1994-95 and 2002-03, with about 58% of households primarily dependent on wages and salaries. The proportion of households reliant on government pensions and allowances decreased slightly to 26.6% in 2002-03, down from 28.4% in 1994-95 and similar levels in the intervening years. Home ownership remained relatively stable at around 70% of households throughout this period, but an increasing proportion of owners had a mortgage.

Life cycle stages

The range of income levels across the population partly reflects the different life cycle stages that people have reached. A typical life cycle includes childhood, early adulthood, and the forming and maturing of families, as illustrated in table 9. Other family situations and household compositions are shown in table 8. The following table compares households in different life cycle stages.

INCOME AND HOUSEHOLD CHARACTERISTICS FOR SELECTED LIFE CYCLE GROUPS, 2002-03

	Number of households	Average number of persons	Average number of employed persons	Average number of dependent children	Proportion with govt. benefits as PSI(a)	Mean equivalised disposable household income per week	Proportion owning home without mortgage
	('000)	no.	no.	no.	%	$	%
Lone person aged under 35	371.8	1.0	0.8	-	10.3	528	3.9

Couple only, reference person aged under 35	442.6	2.0	1.8	-	3.4	765	5.5
Couple, one family with dependent children							
Couple with dependent children only							
Eldest child aged under 5	405.6	3.4	1.4	1.4	10.3	478	8.1
Eldest child aged 5 to 14	856.8	4.2	1.5	2.2	8.2	493	17.7
Eldest child aged 15 to 24	467.0	4.2	2.3	2.2	8.4	462	29.3
Couple with dependent & non-dependent children only	243.8	4.6	2.9	1.5	*5.6	542	32.5
Other couple, one family with dependent children	72.1	5.1	2.0	1.8	18.2	498	32.9
Total couple, one family with dependent children	2,045.2	4.1	1.9	1.9	8.7	490	20.7
Couple, one family with non-dependent children only	430.1	3.3	2.3	-	11.0	644	54.8
Couple only, reference person aged 55 to 64	453.2	2.0	1.0	-	24.5	527	72.5
Couple only, reference person aged 65 and over	609.9	2.0	0.2	-	66.4	362	88.7
Lone person aged 65 and over	680.2	1.0	-	-	79.9	305	71.7
One parent, one family households with dependent children	428.8	2.9	0.8	1.7	48.9	352	14.0

* estimate has a relative standard error of 25% to 50% and should be used with caution
- nil or rounded to zero (including null cells)
(a) Principal source of income

Of the groups included in the table, the group with the highest mean income was younger couples without children. Their mean equivalised disposable household income was $765 per week, with the average number of employed persons in the household being 1.8. For couples with dependent children only, and with the eldest child being under five, their mean equivalised disposable household income was $478 per week. Compared with younger couples without children, this lower income reflects a 20% lower after tax income, principally reflecting the lower average number of employed persons in these households (1.4) and the larger average household size (3.4 persons) over which incomes are shared. Average incomes were higher for households with non-dependent children, reflecting higher proportions of employed persons in these households, but were lower again for households comprising older couples and lone persons, where the numbers of employed persons were

substantially lower.

People aged 65 and over had the lowest mean incomes, with lone persons' incomes at $305 per week, somewhat lower than older couple only household incomes at $362 per week. Elderly lone persons were more likely than elderly couples to have government pensions and allowances as their principal source of income (80% compared to 66%), while couples were more likely to fully own their home (89% compared to 72%).

Households comprising one parent with dependent children had a mean income of $352 per week, similar to that of elderly couples ($362 per week), but only 14% of the one parent households fully owned their home and therefore a substantially greater proportion had to make mortgage or rental payments from their income. Of these households, 49% had government pensions and allowances as their principal source of income. On average they had 0.8 employed persons in the household.

States and territories

There are considerable differences in the average levels of income between the states and territories, with three having mean equivalised disposable household incomes below the national mean of $510 per week (see table 13). Tasmania's mean weekly income was 15% below the national mean income level, followed by South Australia and Queensland (both 5% below). In table 13 the Australian Capital Territory is shown with the highest mean income (26% above the national average). This high income level reflects in part the younger age profile of the ACT. The Northern Territory recorded the second highest mean income (13% above the national average), also reflecting in part its relatively younger population. However, it also reflects the exclusion from the results of sparsely settled areas of the NT which, if included, would be likely to significantly reduce the mean incomes in that territory. The NT estimates of equivalised disposable income are subject to large relative standard errors and should be used with caution. New South Wales and Victoria also recorded mean incomes above the national mean, 3% and 2% respectively, with Western Australian mean income at about the national level.

There are also considerable differences between the incomes recorded in capital cities in Australia compared to those earned elsewhere. At the national level, mean incomes in the capital cities were 20% above those in the balance of state, and in each state (separate information is not available for the NT and ACT) the capital city mean incomes were above those in the balance of state. The largest difference recorded was for NSW where the capital city income was 31% above the mean income across the rest of the state. The smallest difference recorded was for Tasmania where the capital city income was 6% above the rest of the state.

INCOME DISTRIBUTION

While the mean equivalised disposable household income of all households in Australia in 2002-03 was $510 per week, the median (i.e. the midpoint when all people are ranked in ascending order of income) was somewhat lower at $448 (shown as P50 in table 1). This difference reflects the typically asymmetric distribution of income where a relatively small number of people have relatively very high household incomes, and a large number of people have relatively lower household incomes, as illustrated in the following frequency

distribution graph.

4 DISTRIBUTION OF EQUIVALISED DISPOSABLE HOUSEHOLD INCOME, 2002-03
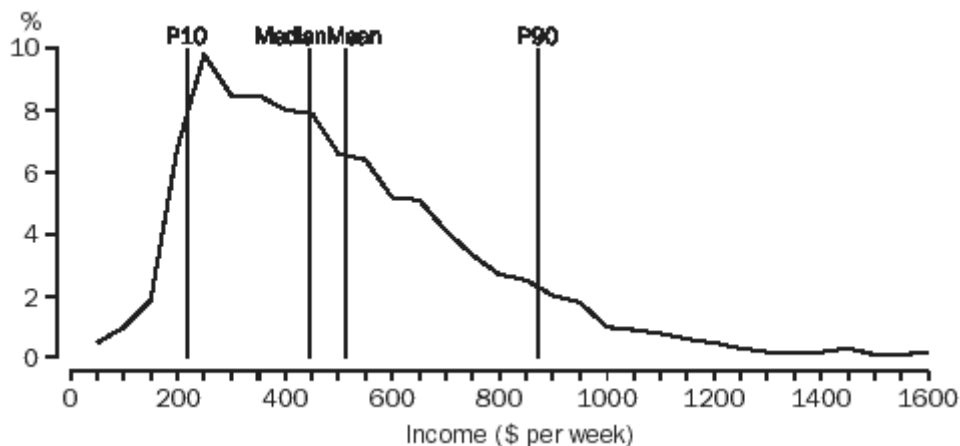
Note: Persons with an income between $25 and $1,625 are shown in $50 ranges on the graph.

Percentile ratios are one measure of the spread of incomes across the population. P90 (i.e. the income level dividing the bottom 90% of the population from the top 10%) and P10 (i.e. dividing the bottom 10% of the population from the rest) are shown on the above graph. In 2002-03, P90 was $870 per week and P10 was $218 per week, giving a P90/P10 ratio of 4.00. Various percentile ratios for seven years are shown in the following table, and the changes in these ratios (discussed below) can provide a picture of changing income distribution over time.

Another measure of income distribution is provided by the income shares going to groups of people at different points in the income distribution. The following table shows that, in 2002-03, 10.6% of total equivalised disposable household income went to people in the 'low income' group (i.e. the 20% of the population in the 2nd and 3rd income deciles), with 38.3% going to the 'high income' group (i.e. the 20% of the population in the highest income quintile).

The Gini coefficient is a single statistic that lies between 0 and 1 and is a summary indicator of the degree of inequality, with values closer to 0 representing a lesser degree of inequality, and values closer to 1 representing greater inequality. For 2002-03, the Gini coefficient was 0.309. The coefficients for earlier years are shown in the following table. Please refer to Appendix 1 for more information on analysing income distribution.

Selected income distribution indicators, Equivalised disposable household income

		1994-95	1995-96	1996-97	1997-98	1999-2000	2000-01	2002-03
Ratios of incomes of households at top of selected income percentiles								
P90/P10	ratio	3.77	3.73	3.66	3.77	3.89	3.98	4.00
P80/P20	ratio	2.56	2.58	2.53	2.56	2.64	2.63	2.63
P80/P50	ratio	1.55	1.58	1.56	1.56	1.57	1.56	1.57
P20/P50	ratio	0.61	0.61	0.62	0.61	0.59	0.59	0.60
Percentage share of total income received by persons with								
Low income(a)	%	10.8	11.0	11.0	10.8	10.5	10.5	10.6
Middle income(b)	%	17.7	17.7	17.8	17.7	17.7	17.6	17.6

High income(c)	%	37.8	37.3	37.1	37.9	38.4	38.5	38.3
Gini coefficient	no.	0.302	0.296	0.292	0.303	0.310	0.311	0.309

(a) Persons in the second and third income deciles
(b) Persons in the middle income quintile
(c) Persons in the highest income quintile

Changes since 1994-95

Changes in the income distribution measures presented in this publication tend to be relatively small from year to year but trends can emerge over longer time periods.

The movements in the indicators in the previous table all suggest some possible rise in income inequality over the period 1994-95 to 2002-03, but not all the movements are large enough to be regarded as statistically significant at the 95% confidence level (see Appendix 4: Sampling variability). The statistically significant movements are the increases in the P90/P10 and the decline in the share of total income going to persons with low income.

In addition to looking at the changes in income distribution measures from one year to another, a perspective on changes in income distribution can also be obtained by bringing data from the intervening years into the analysis. Looking at the results over the period 1994-95 to 1997-98 and comparing them with observations from 1999-2000 to 2002-03 shows somewhat greater changes in the income distribution measures than those resulting from a comparison between the single years of 1994-95 and 2002-03. Because the effective samples are greater when data are combined across years, and the sampling errors are therefore lower, the increases in the inequality indicators can be regarded as statistically significant with a higher degree of confidence, further supporting a conclusion of some increase in inequality.

About this Release

ABOUT THIS RELEASE

Previously: Survey of Income and Housing Costs and Amenities: Income Distribution: Income Units, Australia. Released under that title for 1990. Current title used for 1994-95 issues onwards.

Details are presented on the distribution of income in Australia, data on the various characteristics of households (married couple, one parent and one-person units), their composition, and the principal source of income, age and employment status of reference person.

Irregular from 1978-79 to 1990. Annual as from 1994-95. Biannual from 2001.

Explanatory Notes

Explanatory Notes

INTRODUCTION

1 This publication presents the income and characteristics of households and persons resident in private dwellings in Australia, compiled from the 2002-03 Survey of Income and Housing (SIH), previously known as the Survey of Income and Housing Costs. The survey collected information on sources of income, amounts received and characteristics of persons aged 15 years and over resident in private dwellings throughout non-sparsely settled areas of Australia.

2 The SIH was conducted continuously from 1994-95 to 1997-98, and then in 1999-2000, 2000-01 and 2002-03 (charges may apply). The 2002-03 SIH included an expanded sample of 10,000 households (up from about 7,000 households in earlier years). In 2003-04, and every sixth year thereafter, the Household Income and Expenditure Survey (HIES) has a sample of about 11,000 households contributing to income estimates. The SIH will be conducted, with an 11,000 household sample, every two years in between the HIES cycles, to provide a biennial household income series.

3 Previous surveys of household income were conducted by the Australian Bureau of Statistics (ABS) in 1979, 1982, 1986 and 1990. These surveys were generally conducted over a two-month period, compared to a twelve-month period for the SIH and HIES. The SIH and HIES also included improvements to the survey weighting and estimation procedures, changes to the population in scope and changes to interviewing methods.

CONCEPTS AND DEFINITIONS

4 The concepts and definitions relating to statistics of income are described in the following section. Other definitions are included in the Glossary.

Person and household data

5 A major determinant of economic wellbeing for most people is the level of income they and other family members in the same household receive.

6 While income is usually received by individuals, it is normally shared between partners in a couple relationship and with dependent children. To a lesser extent, it may be shared with other children, other relatives and possibly other people living in the same household, for example through the provision of free or cheap accommodation. This is particularly likely to be the case for children other than dependants and other relatives with low levels of income of their own. Even when there is no transfer of income between members of a household, nor provision of free or cheap accommodation, members are still likely to benefit from the economies of scale that arise from the sharing of dwellings.

7 Household characteristics, including household income, are therefore the main information

required for analysing income distribution. However, it is the number of people who belong to households with particular characteristics, rather than the number of households with those characteristics, that is of primary interest in measuring income distribution and leads to the preference for the equal representation of those persons in such analysis. For example, if the person is used as the unit of analysis rather than the household, then the representation in the income distribution of each person in a household comprising four persons is the same as that for each person in a household comprising two persons. In contrast, if the household were to be used as the unit of analysis, each person in the four person household would only have half the representation of each person in the two person household.

8 In this publication, the income distribution measures are all calculated with respect to persons, including children. Such measures are sometimes known as person weighted estimates. They are described in more detail in Appendix 1 (Analysing income distribution). Nevertheless, as most of the relevant characteristics of persons relate to their household circumstances, tables 6 to 13 primarily describe the households to which people belong.

Income

9 Income refers to regular and recurring cash receipts from employment, investments and transfers from government, private institutions and other households. Gross income is the sum of the income from all these sources before income tax and the Medicare levy have been deducted. This differs from the household income definition used in the Australian System of National Accounts (ASNA). A detailed comparison of 1997-98 SIH and ASNA estimates was published as an appendix to the 1997-98 issue of this publication. Comparison of SIH data from 1994-95 to 2002-03 with ASNA data indicates that the relationship between the two estimates has not changed significantly over that period.

10 Sources from which income may be received include:

- wages and salaries (whether from an employer or own corporate enterprise)
- profit/loss from own unincorporated business (including partnerships)
- investment income (interest, rent, dividends, royalties)
- government cash transfers (pensions, allowances, benefits)
- private cash transfers (e.g. superannuation, regular workers' compensation, income from annuities, child support, and other transfers from other households).

11 Receipts which are excluded from income because they are not regular or recurring cash payments include the following:

- income in kind including employee benefits such as the provision of a house or a car
- employer contributions to pension and superannuation funds
- capital transfers such as inheritances and legacies, maturity payments on life insurance policies, lump sum compensation for injuries or other damage
- capital gains and losses.

12 Receipts of family tax benefit are treated as income, regardless of whether they are received fortnightly or as a lump sum. The aged persons' savings bonus and self-funded retirees' supplementary bonus, paid as part of the introduction of The New Tax System in 2000-01, are regarded as capital transfers as they were designed to help retired people maintain the value of their savings and investments following the introduction of the GST.

However, the one-off payment to seniors announced in the May 2001 Budget and paid in 2000-01 is included as income as it was primarily a supplement to existing income support payments.

13 While income generally provides a useful indicator of economic wellbeing, there are some circumstances which present particular difficulties. Some households report extremely low and even negative income in the SIH, which places them well below the safety net of income support provided by social security pensions and allowances. Households may underreport their incomes in the SIH at all income levels, including low income households. However, households can correctly report low levels of income if they incur losses in their unincorporated business or have negative returns from their other investments. Studies of income and expenditure reported in the 1998-99 ABS Household Expenditure Survey (HES) have shown that such households in the bottom income decile and with negative gross incomes tend to have expenditure levels that are comparable to those of households with higher income levels (and slightly above the average expenditures recorded for the fifth decile), indicating that these households have access to economic resources, such as wealth, which are not measured in the SIH, or that the instance of low or negative income is temporary, perhaps reflecting business or investment start up. Other households in the bottom income decile in the 1998-99 HES had average incomes at about the level of the single pension rate, were predominately single person households, the average age of the reference person was 53 years, and their principal source of income was largely government cash benefits. However, on average, these households also had expenditures above the average of the households in the second decile, which is not inconsistent with the use of assets to maintain a higher standard of living than implied by their incomes alone. Therefore it can be reasonably concluded that most are unlikely to be suffering extremely low levels of economic wellbeing, and income distribution analysis may lead to inappropriate conclusions if such households are included. For this reason, tables showing statistics classified by income quintile include a supplementary category comprising the second and third deciles, which can be used as an alternative to the lowest income quintile. (For an explanation of quintiles and deciles, see Appendix 1 (Analysing income distribution).)

Weekly income

14 Income is collected using a number of different reporting periods, such as the last financial year for own business and property income, and the usual payment for a period close to the time of interview for wages and salaries, other sources of private income and government cash transfers. The income reported is divided by the number of weeks in the reporting period. Estimates of weekly income in this publication therefore do not refer to a given week within the reference year of the survey.

Equivalised disposable income

15 For most analyses in this publication, gross income (as described in the previous paragraphs) is adjusted in two ways to facilitate the comparison of economic wellbeing between households. Firstly, disposable income is derived by deducting estimates of personal income tax and the Medicare levy from gross income. Disposable income better represents the economic resources available to meet the needs of households. A more detailed analysis of 'final' income which looks at the impact of indirect government benefits (i.e. non-cash benefits) and indirect taxes requires detailed information on expenditure patterns which is not available in the SIH. For details of this type of 'final' income analysis see **Government Benefits, Taxes and Household Income, Australia, 1998-99** (cat. no. 6537.0).

16 Disposable income is also adjusted by the application of an equivalence scale to facilitate comparison of income levels between households of differing size and composition, reflecting the requirement of a larger household to have a higher level of income to achieve the same standard of living as a smaller household. Where disposable income is negative, it is set to zero equivalised disposable income. For more information on equivalised income see Appendix 3 (Equivalised disposable household income).

Annual income

17 The tables in the main body of this publication refer to 'current' weekly income, that is, income being received at the time the data were collected from respondents. The survey also produces measures of 'annual' income that reflect total incomes for the previous financial year. Appendix 2 (Current and annual income) explains how current income differs from annual income, notes some of the advantages and disadvantages of the two types of measure and presents some 'annual' income estimates.

SURVEY METHODOLOGY

Scope and coverage

18 The survey collects information by personal interview from usual residents of private dwellings in urban and rural areas of Australia, covering about 98 per cent of the people living in Australia. Private dwellings are houses, flats, home units, caravans, garages, tents and other structures that are used as places of residence at the time of interview. Long-stay caravan parks are also included. These are distinct from non-private dwellings which include hotels, boarding schools, boarding houses and institutions. Residents of non-private dwellings are excluded.

19 The survey also excludes:

- households which contain members of non-Australian defence forces stationed in Australia
- households which contain diplomatic personnel of overseas governments
- households in remote and sparsely settled areas of the Northern Territory, accounting for about 20% of the population in the Northern Territory.

Sample design

20 The sample for the income survey is a sub-sample of private dwellings included in the ABS Monthly Population Survey (MPS). The MPS sample is a multistage selection of private dwellings and a list sample of other dwellings.

21 The sample is suitable for producing reliable estimates at the Australian level for income of residents in private dwellings, classified by different population groups based on household composition (such as couples with children), income levels or income sources. Estimates at the state and territory level for broad aggregates are generally reliable although some estimates for Tasmania, the Northern Territory and the Australian Capital Territory should be used with caution (see Appendix 4: Sampling variability).

22 In each month in 2002-03 a sample of dwellings was selected for the SIH from the responding households in the MPS. Over the year, about 80% of persons over the age of 15 in this sample responded.

Non-response and imputation

23 Fully non-responding households are those selected for the survey but from which no information is included in the survey results. They include:

- those affected by death or illness of a household member
- those in which more than half of the persons over 15 in the household did not respond because they could not be contacted, had language problems or refused to participate.

24 Partial response occurs when:

- some items of data in a schedule are missing because a person is unable or unwilling to provide the data
- for a household, not every person over 15 residing in the household responds but at least half of these persons provide data.

25 In the first case of partial response above, the data provided are retained and the missing data are imputed by replacing each missing value with a value reported by another person (referred to as the donor).

26 For the second type of partial response, the data for the persons who did respond are retained, and data for each missing person are provided by imputing data values equivalent to those of a fully responding person (donor). Imputation using donor records is also applied for fully non-responding households that comprise one person or a sole parent whose children are all under the age of 15. Information about the household composition is obtained from the MPS.

27 Donor records are selected by matching information on sex, age and labour force characteristics of the person with missing information. As far as possible, the imputed information is an appropriate proxy for the information that is missing. Depending on which values are to be imputed, donors are chosen from the pool of individual records with complete information for the block of questions where the missing information occurs.

Final sample

28 The final sample on which estimates are based, is composed of persons for which all necessary information is available. The information may have been wholly provided at the interview (fully-responding) or may have been completed through imputation for partially responding or non-responding. The final sample consists of 10,211 households, comprising 19,402 persons 15 years old and over. All income information was imputed for 596 households comprising one adult or one adult with children under 15 years old, and was imputed for one or more persons in 240 partially responding multi-person households.

Number of responding households

	Capital City		Balance of State		Total	
	Households no.	**Persons(a)** no.	**Households** no.	**Persons(a)** no.	**Households** no.	**Persons(a)** no.
NSW	1,325	2,590	838	1,491	2,163	4,081
Vic.	1,448	2,873	617	1,151	2,065	4,024
Qld	935	1,816	1,017	1,871	1,952	3,687
SA	943	1,760	321	611	1,264	2,371
WA	1,071	2,050	328	606	1,399	2,656
Tas.	308	563	433	808	741	1,371
NT	169	319	-	-	169	319
ACT	458	893	-	-	458	893
Aust.	6,657	12,864	3,554	6,538	10,211	19,402

- nil or rounded to zero (including null cells)
(a) Number of persons aged 15 years and over.

Weighting

29 Expansion factors, or weights, are values by which information for the sample is multiplied to produce estimates for the whole population. From this survey, estimates are produced referring to persons, to income units (although these are not included in this publication) and to households, and the weights are calculated so that each person in an income unit or household has the same weight and that weight is also used for the income unit and household.

30 Final weights are calculated through an iterative procedure in which initial weights are adjusted by a calibration process to ensure that survey estimates conform to independently estimated benchmarks. The initial weights are equal to the inverse of the probability of selection in the survey, with initial person weights being equal to initial household weights.

31 Four types of benchmarks are used in the calibration of the final weights:

- numbers of persons aged 15 and over
- numbers of children under age 15
- numbers of households
- for estimates for 1999-2000 and 2000-01, the value of government benefit cash transfers.

32 Person benchmarks for persons aged 15 and over are estimates of the number of people in each state and territory by age and sex, the number of people in each state and the ACT by labour force status and the number of people in each state living in the capital city or the balance of the state.

33 A separate set of benchmarks is used for children under 15, since there are not individual person records for them in the survey. Information about children is recorded on household records, however, and benchmarks for the number of children aged 0-4 and aged 5-14 are used for each state and territory.

34 Numbers of households are calibrated to benchmarks for total Australia with respect to household composition (based on the number of adults (1, 2 or 3) and whether or not the

household contains children).

35 The person and household benchmarks are based on estimates of numbers of persons and households in Australia. The benchmarks are adjusted to include persons and households residing in private dwellings only and therefore do not, and are not intended to, match estimates of the Australian resident population published in other ABS publications.

36 The fourth type of benchmark relates to income from social security transfers, and is only used for estimates for 1999-2000 and 2000-01. The benchmark was introduced for these years because, without it, the survey estimates of income from government benefit cash transfers accounted for a significantly smaller proportion of aggregate social security payments reported by the Department of Family and Community Services and the Department of Veterans' Affairs. Extensive investigations could not identify any specific reasons for the decline, indicating that it is likely to be associated with differences between the characteristics of people who respond to the survey and the characteristics of those who do not respond. This type of problem is sometimes called non-response bias, and introducing additional benchmarks is a means of addressing it. The benchmark introduced in this case ensured that the survey estimate of government benefit cash transfers was maintained at a proportion of aggregate benefit cash transfers that is consistent with the proportion achieved between 1994-95 and 1997-98 and in 2002-03. More detail of the investigations that led to the introduction of this benchmark is provided in Appendix 4 (Sampling variability) of the 2000-01 issue of this publication, released in July 2003.

Estimation

37 Estimates produced from the survey are usually in the form of averages (e.g. mean weekly income of couples with dependent children), or counts (e.g. total number of households that own their dwelling or total number of persons living in households that own their own dwelling). For counts of households, the estimate is obtained by summing the weights of all households in the required group (e.g. those owning their own dwelling). For counts of persons, the household weights are multiplied by the number of persons in the household before summing. The SIH collects data on the number of people, including children, in each household but separate records with income and other detailed data are only collected for people 15 years and older. Therefore, counts of persons cannot be obtained by summing the weights of all persons.

38 Average income values are obtained in two different ways, depending on whether mean gross household income or mean equivalised disposable household income is being derived. Estimates of mean gross household income are obtained by multiplying the gross income of each household by the weight of the household, summing across all households, and then dividing by the estimated number of households. For example, the mean gross household income of couples with dependent children is the weighted sum of the gross income of each such household divided by the estimated number of those households. Estimates of mean equivalised disposable household income are obtained by multiplying the equivalised disposable income of each household by the number of people in the household (including children) and by the weight of the household, summing across all households, and then dividing by the estimated number of people in the population group. Appendix 3 (Equivalised disposable household income) illustrates the differences between mean gross household income calculated on a household weighted basis and mean equivalised disposable household income calculated on a person weighted basis.

Reliability of estimates

39 The estimates provided in this publication are subject to two types of error, non-sampling and sampling error.

Non-sampling error

40 Non-sampling error can occur whether the estimates are derived from a sample or from a complete collection.

41 Non-sampling error can arise through the inability to obtain data from all households included in the sample. Although adjustments are made through the weighting process (described in paragraphs 29 to 36) to reflect the differing response rates of the various groups in the population, some non-response bias may remain because of differences that exist between the characteristics of respondents and non-respondents.

42 There can also be errors in reporting on the part of both respondents and interviewers. Reporting errors may arise through inappropriate wording of questions, misunderstanding of what data are required, inability or unwillingness to provide accurate information, or mistakes in answers to questions.

43 Errors may also arise during processing of the survey data through mistakes in coding and data recording.

44 Non-sampling errors are difficult to measure in any collection. However, every effort is made to minimise these errors. In particular, the effect of the reporting and processing errors described above is minimised by careful questionnaire design, intensive training and supervision of interviewers, asking respondents to refer to records whenever possible and by extensive editing and quality control checking at all stages of data processing.

45 The error due to incomplete response is minimised by

- call-backs to all initially non-responding households in order to explain the importance of their cooperation to the survey
- adjustment to the weights allocated to the respondent households in order to allow for households with similar characteristics from which comprehensive data are not obtained.

Sampling error

46 The estimates are based on a sample of possible observations and are subject to sampling variability. The estimates may therefore differ from the figures that would have been produced if information had been collected for all households. A measure of the sampling error for a given estimate is provided by the standard error, which may be expressed as a percentage of the estimate (relative standard error). Further information on sampling error is given in Appendix 4 (Sampling variability).

ACKNOWLEDGMENT

47 ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated: without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence as required by the **Census and Statistics Act 1905**.

STANDARD PRODUCTS

48 This publication, also available as a pdf file from this web site (for a fee), provides a summary of the income related data available from the Survey of Income and Housing. In addition to selected text and tabular information provided in this set of webpages, a range of other products and services are also available. All of the tables in the main body of this publication are available, for a fee, as spreadsheets from this web site. The data cubes under 6523.0 also include tables of RSEs provided (free of charge) for each publication table. Additional tables (cat. no. 6523.0.55.001) have been released on the ABS web site concurrently with this publication, including tables of counts relating to publication tables of proportions, as well as more detailed dissections, such as by age of persons in the household, and additional classifications.

SPECIAL DATA SERVICES

49 The ABS offers specialist consultancy services to assist clients with more complex statistical information needs. Clients may wish to have the unit record data analysed according to their own needs, or require tailored tables incorporating data items and populations as requested by them. Tables and other analytic outputs can be made available electronically or in printed form. However, as the level of detail or disaggregation increases with detailed requests, the number of contributors to data cells decreases. This may result in some requested information not being able to be released due to confidentiality or sampling variability constraints. All specialist consultancy services attract a service charge, and clients will be provided with a quote before information is supplied. For further information, contact ABS information consultants on 1300 135 070.

UNIT RECORD FILE

50 It is expected that a confidentialised unit record file (CURF) from the 2002-03 SIH will be released on CD-ROM in February 2005. It is also expected that a more detailed SIH CURF will be available through the ABS Remote Access Data Laboratory. A full range of up-to-date information about the availability of ABS CURFs and about applying for access to CURFs is available via this web site. Inquiries to the ABS CURF Management Unit should email: curf.management@abs.gov.au, or telephone (02) 6252 5853.

RELATED PUBLICATIONS

51 Users may wish to refer to the following ABS products which relate to income (charges

may apply):

> **Government Benefits, Taxes and Household Income, Australia, 1998-99,** cat. no. 6537.0
> **Household Expenditure Survey, Australia: User Guide, 1998-99**, cat. no. 6527.0, available free of charge from the ABS web site
> **Household Expenditure Survey, Australia: Summary of Results, 1998-99,** cat. no. 6530.0
> **Household Expenditure Survey, Australia: Detailed Expenditure Items, 1998-99**, cat. no. 6535.0
> **Housing Occupancy and Costs, Australia, 2000-01**, cat. no. 4130.0.55.001
> **Labour Force, Australia**, cat. no. 6202.0 - issued monthly
> **Survey of Income and Housing Costs and Amenities: Income Units, Australia, 1990**, cat. no. 6523.0
> **Survey of Income and Housing Costs, Australia: Data Reference pack, 1997**, cat. no. 6553.0
> **Average Weekly Earnings, Australia - Preliminary**, cat. no. 6301.0 - issued quarterly
> **Measuring Wellbeing: Frameworks for Australian Social Statistics, 2001**, cat. no. 4160.0
> **Measures of Australia's Progress, 2004**, cat. no. 1370.0

52 Users may also wish to refer to the following non-ABS products which relate to income:

> **Taxation Statistics 2001-02, A summary of taxation, superannuation and industry benchmark statistics** (Australian Taxation Office)
> **Occasional Paper No. 1: Income support and related statistics: a 10-year compendium, 1989-1999** (Department of Family and Community Services)

Glossary

Benefit transfers

See Government pensions and allowances.

Capital cities

Australia's six State capital city statistical divisions. For the Northern Territory and the Australian Capital Territory the estimates relate predominantly to urban areas.

Couple, one family household

One family household consisting of:

- one couple only
- one couple, with their dependent and/or non-dependent children only
- one couple, with or without children, plus other relatives

- one couple, with or without children and other relatives, plus unrelated individuals.

Couple

Two people in a registered or de facto marriage, who usually live in the same household.

Decile

Groupings that result from ranking all households or people in the population in ascending order according to some characteristic such as their household income and then dividing the population into 10 equal groups, each comprising 10% of the estimated population.

Dependent children

All persons aged under 15 years; and people aged 15-24 years who are full-time students, have a parent in the household and do not have a partner or child of their own in the household.

Disposable income

Gross income after income tax and the Medicare levy are deducted and family tax benefit paid through the tax system or as a lump sum by Centrelink is added. Income tax and the Medicare levy are imputed based on each person's income and other characteristics as reported in the survey. Family tax benefit is estimated on the basis of reductions in pay-as-you-go tax payments, as reported in the survey, or imputed on the basis of each family's income and composition. Disposable income is sometimes referred to as net income.

Employed persons

Persons aged 15 years and over who, during the week before the interview:

- worked one hour or more for pay, profit, commission or payment in kind in a job or business, or on a farm (includes employees, employers and own account workers)
- worked one hour or more, without pay, in a family business or on a family farm
- had a job, business or farm but was not at work because of holidays, sickness or other reason.

Employee

An employed person who, for most of his/her working hours:

- works for a public or private employer and receives remuneration in wages or salary, or is paid a retainer fee by his/her employer and works on a commission basis, or works for an employer for tips, piece-rates or payment in kind
- operates his or her own incorporated enterprise with or without hiring employees.

Employer

A person who operates his or her own unincorporated economic enterprise or engages independently in a profession or trade, and hires one or more employees.

Equivalised disposable household income

Disposable household income adjusted using an equivalence scale. For a lone person household it is equal to disposable household income. For a household comprising more than one person, it is an indicator of the disposable household income that would need to be received by a lone person household to enjoy the same level of economic wellbeing as the household in question. For further information see Appendix 3 (Equivalised disposable household income).

Family

Two or more people, one of whom is at least 15 years of age, who are related by blood, marriage (registered or de facto), adoption, step or fostering, and who usually live in the same household. A separate family is formed for each married couple, or for each set of parent-child relationships where only one parent is present.

Full-time employed

Employed persons who usually work 35 hours or more a week (in all jobs).

Full-time student

A person 15 years or over who is classified as a full-time student by the institution they attend, or considers himself/herself to be a full-time student. Full-time study does not preclude employment.

Gini coefficient

A summary measure of inequality of income distribution. For further information see Appendix 1 (Analysing income distribution).

Government pensions and allowances/Government cash benefits

Regular, recurring receipts from government to persons under social security and related government programs. Included are pensions and allowances received by aged, disabled, unemployed and sick persons, families and children, veterans or their survivors, and study allowances for students. Sometimes referred to as government benefit transfers. All

overseas pensions and benefits are included here, although some may not be paid by overseas governments. Note that family tax benefit paid fortnightly through Centrelink is included here. However, family tax benefit paid through the tax system or as a lump sum by Centrelink is not included here or in gross income. It is included under disposable income.

Gross income

Regular cash receipts before income tax or the Medicare levy are deducted.

Group household

A household consisting of two or more unrelated people where all people are aged 15 years and over. There are no reported couple relationships, parent-child relationships or other blood relationships in these households.

Household

A group of related or unrelated people who usually live in the same dwelling and make common provision for food and other essentials of living; or a lone person who makes provision for his or her own food and other essentials of living without combining with any other person. Lodgers who receive accommodation only (not meals) are treated as a separate household. Boarders who receive accommodation and meals, are treated as part of the household.

Household composition

Classifies households into three broad groupings based on the number of families present (one family, multiple family and non-family). One family households are further disaggregated according to the type of family (such as couple family or one parent family) and according to the number of dependent and non-dependent children, other relatives and unrelated individuals present. Non-family households are disaggregated into lone person households and group households.

Income

Regular and recurring cash receipts including moneys received from wages and salaries, government pensions and allowances, and other regular receipts such as superannuation, workers' compensation, child support, other transfers from other households, scholarships, profit or loss from own unincorporated business or partnership and investment income. Gross income is the sum of the income from all these sources before income tax or the Medicare levy are deducted. Other measures of income are disposable income and equivalised disposable income. Note that child support and other transfers from other households are not deducted from the incomes of the households making the transfers.

Income unit

One person or a group of related persons within a household, whose command over income is assumed to be shared. Income sharing is assumed to take place within married (registered or de facto) couples, and between parents and dependent children. The income unit was the unit of analysis used in the 1994-95 to 1999-2000 issues of this publication, but more recent issues uses the person as the unit of analysis with persons mostly described according to the characteristics of the household to which they belong.

Labour force status

Classifies all people aged 15 years and over according to whether they were employed, unemployed or not in the labour force.

Landlord type

For renters, the type of entity to whom rent is paid or with whom the tenure contract or arrangement is made. Renters belong to one of the following categories:

- state/territory housing authority - where the household pays rent to a state or territory housing authority or trust
- private landlords - where the household pays rent to a real estate agent or to another person not in the same household
- other - where the household pays rent to the owner/manager of a caravan park, an employer (including a government authority), a housing cooperative, a community or church group, or any other body not included elsewhere.

Lone person household

A household consisting of a person living alone.

Mean income

The total income received by a group of units divided by the number of units in the group.

Median income

That level of income which divides the units in a group into two equal parts, one half having incomes above the median and the other half having incomes below the median.

Negative income

Income may be negative when a loss accrues to a household as an owner or partner in unincorporated enterprises or rental properties. Losses occur when operating expenses and depreciation are greater than gross receipts.

Non-family household

Consists of unrelated people only. A non-family household can be either a person living alone or a group household.

Not in the labour force

Persons not in the categories employed or unemployed as defined.

One family household

A household containing only one family. Unrelated individuals may also be present.

One parent, one family household

A one family household comprising a lone parent with at least one dependent or non-dependent child. The household may also include other relatives and unrelated individuals.

Other family household

A household with an extended family (e.g. grandparents, parents and children); and a household with multiple families.

Other income

Income other than wages and salaries, own business or partnership income and government pensions and allowances. This includes income received as a result of ownership of financial assets (interest, dividends), and of non-financial assets (rent, royalties) and other regular receipts from sources such as superannuation, child support, workers' compensation and scholarships. Income from rent is net of operating expenses and depreciation and may be negative when these are greater than gross receipts.

Other landlord type

Where the household pays rent to the owner/manager of a caravan park, an employer (including a government authority), a housing cooperative, a community or church group, or any other body not included elsewhere.

Other tenure type

A household which is not an owner, a purchaser or a renter.

Own account worker

A person who operates his or her own unincorporated economic enterprise or engages independently in a profession or trade and hires no employees.

Own unincorporated business income

The profit/loss that accrues to persons as owners of, or partners in, unincorporated enterprises. Profit/loss consists of the value of gross output of the enterprise after the deduction of operating expenses (including depreciation). Losses occur when operating expenses are greater than gross receipts and are treated as negative income.

Owner (of dwelling)

A household in which at least one member owns the dwelling in which it usually resides. Owners are divided into two classifications - owners without a mortgage and owners with a mortgage. If there is any outstanding mortgage or loan secured against the dwelling the household is an owner with a mortgage. If there is no mortgage or loan secured against the dwelling the household is an owner without a mortgage.

Percentile

When all households or people in the population are ranked from the lowest to the highest on the basis of some characteristic such as their household income, they can then be divided into equal sized groups. Division into 100 groups gives percentiles. The highest value of the characteristic in the tenth percentile is denoted P10. The median or the top of the 50th percentile is denoted P50. P20, P80 and P90 denote the highest values in the 20th, 80th and 90th percentiles. Ratios of values at the top of selected percentiles, such as P90/P10, are often called percentile ratios.

Principal source of income

That source from which the most positive income is received. If total income is nil or negative the principal source is undefined.

Private income

Regular, recurring receipts from private organisations, including superannuation, regular workers' compensation, income from annuities, interest, dividends, royalties, income from rental properties, private scholarship and child support.

Quintiles

Groupings that result from ranking all households or people in the population in ascending order according to some characteristic such as their household income and then dividing the population into five equal groups, each comprising 20% of the estimated population.

Ratio of household incomes at top of selected income percentiles

See percentile.

Reference person

The reference person for each household is chosen by applying, to all household members aged 15 years and over, the selection criteria below, in the order listed, until a single appropriate reference person is identified:

- the person with the highest tenure when ranked as follows: owner without a mortgage, owner with a mortgage, renter, other tenure
- one of the partners in a registered or de facto marriage, with dependent children
- one of the partners in a registered or de facto marriage, without dependent children
- a lone parent with dependent children
- the person with the highest income
- the eldest person.

For example, in a household containing a lone parent with a non-dependent child, the person with the highest tenure will become the reference person. If the non-dependent child is an owner with a mortgage and the lone parent lives in the dwelling rent free, the non-dependent child will become the reference person. If both individuals have the same tenure, the one with the higher income will become the reference person. However, if both individuals have the same income, the elder will become the reference person.

Renter

A household which pays rent to reside in the dwelling. See further classification by Landlord type.

Tenure type

The nature of a household's legal right to occupy the dwelling in which the household members usually reside. Tenure is determined according to whether the household owns the dwelling outright, owns the dwelling but has a mortgage or loan secured against it, is paying rent to live in the dwelling or has some other arrangement to occupy the dwelling.

Unemployed persons

Persons aged 15 years and over who were not employed during the week before the

interview and

- had actively looked for full-time or part-time work at any time in the four weeks before the interview and:
  - were available for work in the week before the interview, or would have been available except for temporary illness (i.e. lasting for less than four weeks before the interview), or
  - were waiting to start a new job within four weeks from the interview and would have started in the week before the interview if the job had been available then

or

- were waiting to be called back to a full-time or part-time job from which they had been stood down without pay for less than four weeks before the interview for reasons other than bad weather or plant breakdown.

Unincorporated business

A business in which the owner(s) and the business are the same legal entity, so that, for example, the owner(s) are personally liable for any business debts that are incurred.

Wages and salaries

The gross cash income received as a return to labour from an employer or from a person's own incorporated business.

Abbreviations

The following abbreviations have been used in this publication

$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ASNA	Australian System of National Accounts
Aust.	Australia
CPI	Consumer Price Index
DVA	Australian Government Department of Veterans Affairs
FaCS	Australian Government Department of Family and Community Services
GST	Goods and Services Tax
MPS	Monthly Population Survey
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Co-operation and Development
PSI	principal source of income
Qld	Queensland
RSE	relative standard error
SA	South Australia

SE   standard error
SIH   Survey of Income and Housing
Tas.   Tasmania
Vic.   Victoria
WA   Western Australia

Analysing Income Distribution (Appendix)

APPENDIX 1 ANALYSING INCOME DISTRIBUTION

INTRODUCTION

There are many ways to illustrate aspects of the distribution of income and to measure the extent of income inequality. In this publication, five main types of indicator are used - means and medians, frequency distributions, percentile ratios, income shares, and Gini coefficients. This Appendix describes how these indicators are derived.

The Gini coefficient is a single statistic summary of inequality. Analysts sometimes use other single statistic summaries in addition to or instead of the Gini coefficient. This appendix also provides a comparison between the Gini coefficient and some alternative summary measures, the Theil index and the Atkinson index.

MEAN AND MEDIAN

Mean household income (average household income) and median household income (the midpoint when all persons or households are ranked in ascending order of household income) are simple indicators that can be used to show income differences between subgroups of the population. Many tables in this publication include mean household income and median household income data.

In most cases, the income measure used is equivalised disposable household income. As described in Appendix 3, equivalised disposable household income can be viewed as an indicator of the economic resources available to each member of a household. In this publication, therefore, the mean and median values of equivalised disposable household income are always calculated with respect to the relevant number of persons, even where the table is describing households. Measures calculated in this way are sometimes known as person weighted measures. The method of calculation is described under 'Estimation' in the Explanatory Notes.

In some tables describing households, the mean and median of gross household income are also shown. These measures are calculated with respect to the relevant number of households, not persons. They are sometimes known as household weighted measures.

FREQUENCY DISTRIBUTION

A frequency distribution illustrates the location and spread of income within a population. It groups the population into classes by size of household income and gives the number or proportion of people in each income range. A graph of the frequency distribution is a good way to portray the essence of the income distribution. The graph in the Summary of Findings shows the proportion of people within $50 household income ranges.

Frequency distributions can provide considerable detail about variations in the income of the population being described, but it is difficult to describe the differences between two frequency distributions. They are therefore often accompanied by other summary statistics, such as the mean and median. Taken together, the mean and median can provide an indication of the shape of the frequency distribution. As can be seen in the graph (figure 4) in the Summary of Findings, the distribution of income tends to be asymmetrical, with a small number of people having relatively high household incomes and a larger number of people having relatively lower household incomes. The greater the asymmetry, the greater will be the difference between the mean and the median.

QUANTILE MEASURES

When persons (or any other units) are ranked from the lowest to the highest on the basis of some characteristic such as their household income, they can then be divided into equally sized groups. The generic term for such groups is quantiles.

Quintiles, deciles and percentiles

When the population is divided into five equally sized groups, the quantiles are called quintiles. If there are 10 groups, they are deciles, and division into 100 groups gives percentiles. Thus the first quintile will comprise the first two deciles and the first 20 percentiles.

This publication frequently presents data classified into income quintiles, supplemented by data relating to the 2nd and 3rd deciles. The latter is included to enable quintile style analysis to be carried out without undue impact from very low incomes which may not accurately reflect levels of economic wellbeing (see paragraph 13 in the Explanatory Notes).

Equivalised disposable household income is the income measure used to define the quantiles shown in this publication, and the quantiles each comprise the same number of persons, that is, they are person weighted.

Upper values and medians

In some analyses, the statistic of interest is the boundary between quantiles. This is usually expressed in terms of the upper value of a particular percentile. For example, the upper value of the first quintile is also the upper value of the 20th percentile and is described as P20. The upper value of the ninth decile is P90. The median of a whole population is P50, the median of the 3rd quintile is also P50, the median of the first quintile is P10, etc.

Percentile ratios

Percentile ratios summarise the relative distance between two points on the income distribution. To illustrate the full spread of the income distribution, the percentile ratio needs to refer to points near the extremes of the distribution, for example, the P90/P10 ratio. The P80/P20 ratio better illustrates the magnitude of the range within which the incomes of the majority of the population fall. The P80/P50 and P50/P20 ratios focus on comparing the ends of the income distribution with the midpoint.

Income share

Income shares can be calculated and compared for each income quintile (or any other subgrouping) of a population. The aggregate income of the units in each quintile is divided by the overall aggregate income of the entire population to derive income shares.

SINGLE STATISTIC SUMMARIES OF INEQUALITY

Taken together, the simple measures of income distribution described above can provide an indication of changes in the income distribution of a population over time, or differences in the income distributions of two separate populations. However, none of the simple measures comprises a single statistic that summarises the whole income distribution in a way that directly takes into account the individual incomes of all members of the population.

The remainder of this appendix considers some of the issues associated with compiling a single statistic summary of inequality, and compares a number of alternative measures. The first is the Gini coefficient, which is the most commonly used summary measure, and in the past has been the only summary measure included in this publication. The Gini coefficient is compared with the Theil index and a number of Atkinson indexes.


Concept of income inequality

It is generally agreed that perfect equality in the distribution of income can be defined as the situation in which everyone in the population lives in a household with the same equivalised disposable household income (see Appendix 3, Equivalised Disposable Household Income). If any household has lower or higher equivalised disposable household income than any other household, there is inequality in the income distribution. (As for means and medians described above, inequality is measured with respect to the number of persons, but the concept of inequality applies equally if a population of households, income units or other units is under consideration.)

However, there is no unique, generally accepted way of summarising the degree to which a population does not have perfect equality, or, more practically, summarising the difference in inequality between two populations. Unequal distributions of income can occur in many different ways. The majority of people may have very similar incomes with pockets of very high or very low income. Or entire populations may be heavily clustered at the top and the bottom of the income distribution with few people receiving incomes in between these extremes. To evaluate one income distribution as having greater or lesser inequality than another income distribution, it is necessary to compare the distributions in terms of which segments of the population have a greater share of income and which segments have a

lower share. It is then necessary to at least implicitly judge whether the relative gain in income by some people is more than offset or less than offset by the relative loss of income by some other people. Different observers may make different judgments about the same situation, depending on personal preferences, etc. Different summary measures of inequality embody different judgments about the relative gains and losses. As will be seen below, some measures allow the user to explicitly set a parameter to reflect the judgment of the user in this regard.

Simple examples of different patterns of inequality can be used to illustrate the issues under consideration.

For the first example, consider the equivalised disposable household income of the two populations A and B depicted in the diagram A1, **Frequency Distributions I**. Population A is derived from the 2000-01 Survey of Income and Housing (SIH) population after removing people in households with zero income (the reason for deleting households with zero income is explained later in this appendix). Population B covers the same people as in population A, but everyone's income is transformed in a particular way that reduces the proportional differences in income across the population while retaining the same mean income for the population. There are therefore fewer people on very low or very high incomes and more people in between these extremes, with the median for population B closer to the mean, and less spread between P10 and P90
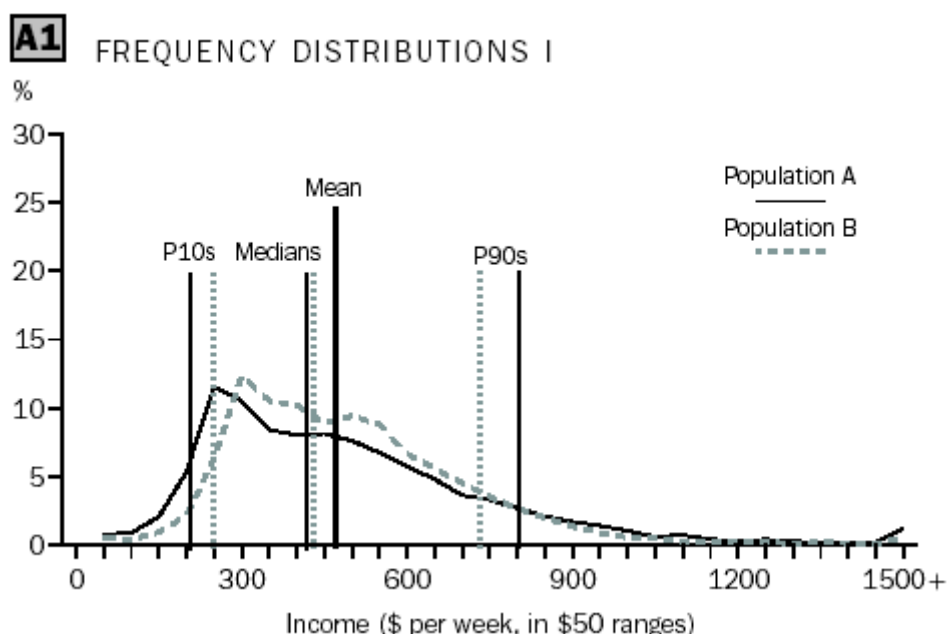
The extent to which the income distributions for populations A and B vary from equality, and from each other, can be illustrated graphically another way, using Lorenz curves.

Lorenz curves

The Lorenz curve is a graph with the horizontal axis showing the cumulative proportion of the persons in the population ranked according to their income and with the vertical axis showing the corresponding cumulative proportion of equivalised disposable household income. The graph then shows the income share of any selected cumulative proportion of the population. The diagonal line represents a situation of perfect equality, that is, all people

have the same equivalised disposable household income. The diagram A2, **Lorenz Curves I** shows the Lorenz curves for the two populations described above.
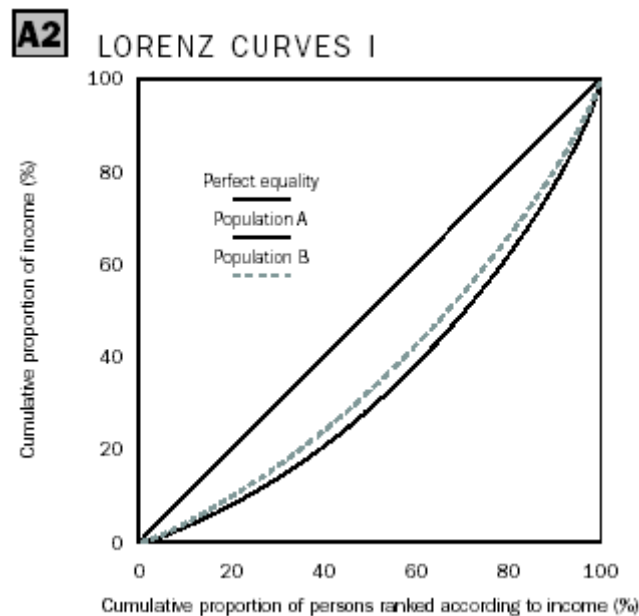
Since the distribution of population B's income is uniformly less widely spread than for population A, all points of the Lorenz curve for population B are closer to the line of perfect equality than the corresponding points of the Lorenz curve for population A. In this situation, population B is said to be in a position of Lorenz dominance and can be regarded as having a more equal income distribution than population A.

However, if the Lorenz curves of two populations cross over there is no Lorenz dominance and there is no generally accepted way of defining which of the two populations has the more equal income distribution.

Consider the income distributions of the populations in a second example, as shown in the diagram A3 **Frequency Distributions II**. Population A is the same as in the first example above. Populations C and D also cover the same people as in population A, and all have the same mean income. But the income of populations C and D are transformed in such a way that the lower income people are relatively better off than for population A and the higher income people are also relatively better off than for population A. Conversely, the incomes of the middle of the population are relatively reduced so that the mean income of the three populations remains the same. Also the ranking of the population by income has not changed the relative position of any person. For population A, the lowest income is $1, for population C it is about $180, and for population D it is about $150. The incomes of the higher income people have received a relatively greater boost for population D than for population C.

A3 FREQUENCY DISTRIBUTIONS II
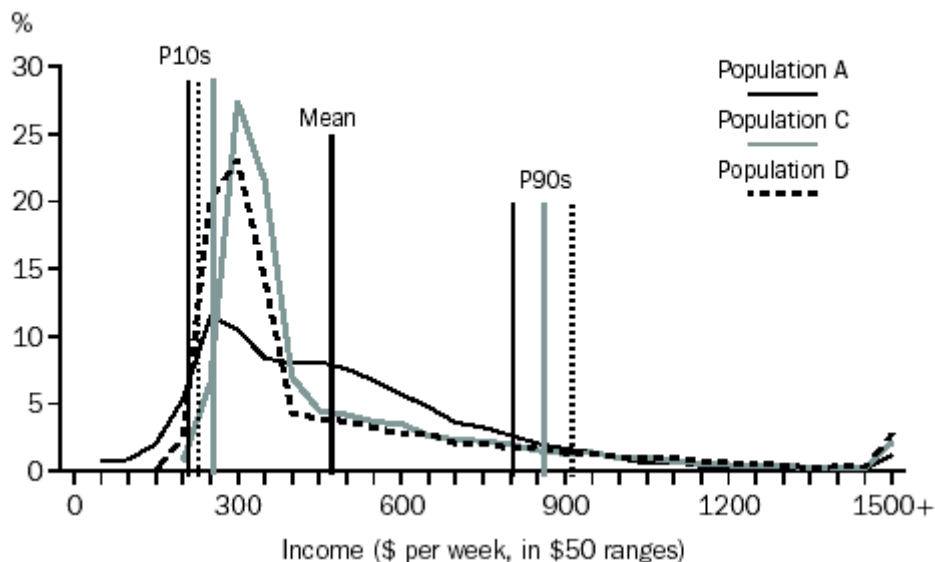
The medians (not shown in the diagram) are higher for populations C and D than for A, but all are below the mean. As for population B in the earlier diagram, P10 for populations C and D is above P10 for population A. However, in contrast to population B, populations C and D also have P90 above that of population A.

The diagram A4, **Lorenz Curves II** shows the resultant differences in the Lorenz curves, with the curves for both populations C and D crossing that of population A. Therefore there is ambiguity about whether populations C and D have greater or less income inequality than population A. Comparing populations C and D to population A, both lower and higher income people have a greater share of total income and middle income people have less. In population C, the lower income people show a relatively greater gain than the higher income people. Conversely, in population D, the higher income people show a relatively greater gain than the lower income people. However, the curve for population C does not cross that of population D, and therefore population C has Lorenz dominance over population D, that is, income is unambiguously distributed more equally in population C than in population D.
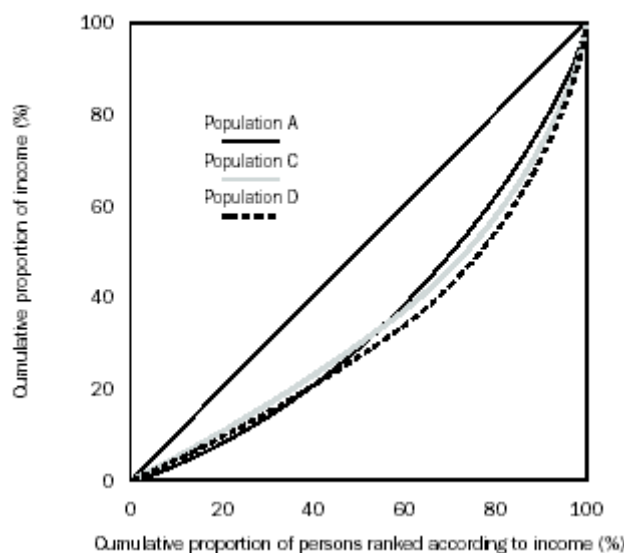

A4 LORENZ CURVES II

Table A8 shows the years for which the income distribution has Lorenz dominance over the income distributions of other years. Table A8 also shows the years for which the lack of Lorenz dominance is due only to the crossing of the Lorenz curves in the bottom decile of the income distribution, that part of the income distribution for which income is not necessarily a good indicator of economic wellbeing.

The Lorenz curves described in this appendix are depicting the relativities between income distributions and do not show whether incomes overall have been growing, contracting or remaining static. Another form of Lorenz curves, known as Generalised Lorenz curves, depict the cumulative incomes of populations after adjusting for differences in average income between the populations. They therefore can be used to analyse differences in the level of income as well as differences in distribution, but do not as clearly show differences in inequality (see, for example, Deaton (1997)). In this publication, differences in the level of income for the low, middle and high income segments of the population are described in the Summary of Findings.

Summary indicators

The three commonly used summary inequality measures mentioned earlier - the Gini coefficient, the Theil index, and the Atkinson index - can be produced for populations A, B, C and D. Table A5 provides the values for these measures with respect to each population, and descriptions of the measures follow. The Atkinson index is considered with a number of different settings of a user defined parameter, as described later.

A5 Comparison of inequality summary measures

	Population A	Population B	Population C	Population D
Has Lorenz dominance over Population:	. .	A	D	. .
Gini coefficient	0.306	0.247	0.313	0.357
Theil index	0.069	0.045	0.084	0.108
Atkinson indexes				
$\varepsilon = 0.5$	0.077	0.051	0.084	0.107
$\varepsilon = 0.75$	0.116	0.077	0.117	0.149
$\varepsilon = 1.0$	0.155	0.103	0.146	0.185
$\varepsilon = 1.25$	0.199	0.133	0.171	0.216
$\varepsilon = 1.5$	0.253	0.167	0.193	0.242
$\varepsilon = 2.0$	0.452	0.274	0.230	0.285

. .   not applicable

Gini coefficient

The Gini coefficient can be defined by referring to the Lorenz curve. It is the ratio of the area between the actual Lorenz curve and the diagonal (or line of equality) compared to the total area under the diagonal. The Gini coefficient equals zero when all people have the same level of income and approaches one when one person receives all the income. In other words, the smaller the Gini coefficient the more equal the distribution of income, given the assumptions underlying the Gini coefficient.

Table A5 shows that the Gini coefficient for population B is substantially below the coefficient for population A. The coefficient for population C is a little above that for population A, and the coefficient for population D is somewhat further above. According to the Gini coefficient,

therefore, population B has a more equal income distribution than population A, but populations C and D have less equal distributions.

Mathematically, the Gini coefficient can be expressed as

$$G = \left(\frac{1}{2n^2\mu}\right) \sum_{ij}^{n} |y_i - y_j|$$

where

> **n** is the number of people in the population
> μ is the mean equivalised disposable household income of all people in the population
> and **yi** and **yj** are the equivalised disposable household income of the ith and jth persons in the population.

The Gini coefficient is a summary of the differences between each person in the population and every other person in the population. The differences are the absolute arithmetic differences, and therefore a difference of $x between two relatively high income people contributes as much to the index as a difference of $x between two relatively low income people.

An increase in the income of a person with income greater than median income will always lead to an increase in the coefficient, and a decrease in the income of a person with income lower than median income will also always lead to an increase in the coefficient. The extent of the increase will depend on the proportion of people that have income in the range between median income and the income of the person with the changed income, both before and after the change in income.

At the extremes, increasing the income of the person with the lowest income by $x or increasing the income of the person with the highest income by $x will respectively decrease and increase the Gini coefficient by the same amount (assuming the lowest income person remains the lowest income person after the change).

Theil index

Another commonly used summary statistic is the Theil index, which can be expressed mathematically as

$$T = \frac{1}{n} \sum_{i=1}^{n} \frac{y_i}{\mu} \; \frac{y_i}{\mu} \log \frac{y_i}{\mu}$$

The Theil index ranges between zero when all incomes are equal and log n when one person receives all the income. It therefore has a higher value if one person in a larger population receives all income compared to if one person in a smaller population receives all income. However, it has the same value for two unequally sized populations if income is distributed with the same proportions in the two populations, that is, they have identical

Lorenz curves. (The other single statistic summary indicators discussed in this appendix also have this characteristic.)

As for the Gini coefficient, if one population has Lorenz dominance over another population, the Theil index for the first population will be lower. Table A5 shows, therefore, that population B has a lower Theil index than population A, and population C has a lower Theil index than population D. The Theil index for population A is also below that for populations C and D.

The construction of the Theil index is substantially different from that of the Gini coefficient. Instead of comparing the income of each person with the income of every other person, the Theil index compares the income of each person with the mean income of the population.

Atkinson index

The Atkinson index is a more complex summary statistic. As in the Theil index, it contains a ratio comparison of each person's income with the population mean. But it also requires the user to set a parameter, ε, specifying a level of 'inequality aversion'. The mathematical expression is

$$A_\varepsilon = 1 - \left[\frac{1}{n} \sum_{i=1}^{n} \left[\frac{y_i}{\mu} \right]^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

for ε not equal to one, and

$$A_1 = 1 - \prod_{i=1}^{n} \left[\frac{y_i}{\mu} \right]^{\frac{1}{n}}$$

for ε equal to one.

An Atkinson index always has a value between zero and one, regardless of the value of For any given value of ε, a lower value of the Atkinson index implies a greater degree of equality in the income distribution.

The 'inequality aversion' parameter, ε, in effect specifies how much more benefit the user thinks an extra dollar would provide to a person with lower income compared to the benefit an extra dollar would provide to a person on a higher income. At the extreme of ε set to zero, the user has no 'inequality aversion'. The benefit of an extra dollar is assumed to be the same for everyone in the population, and the Atkinson index is always equal to zero regardless of whether the incomes in the population are widely dispersed or not.

The higher the setting of ε, the greater the relative benefit derived by a lower income person receiving an extra dollar compared to a higher income person receiving an extra dollar. Consequently, the higher the setting of ε, the more sensitive is the Atkinson index to the ratios of the lowest incomes in the population to the mean income of the population. In

particular, if a population has a number of people with income very close to zero, that is, only a very small proportion of mean income, their influence can dominate the Atkinson index and it has a value close to one.

Table A5 presents the Atkinson index with various settings of ε between 0.5 and 2.0. As expected, the Atkinson indexes for population B are always lower than those for population A, reflecting the Lorenz dominance of population B over population A. Similarly, the Atkinson indexes for population C are always lower than those for population D. However, comparing populations C and D with populations A and B gives a mixed picture.

The higher the setting of ε, the more emphasis the Atkinson index gives to the lowest values in the income distribution. Populations A and B have some values less than one hundredth of the mean, but populations C and D do not. Therefore the Atkinson index increases more quickly for populations A and B as the setting of ε is increased. For ε set to 1.0 and above, population A is measured as having greater income inequality than population C; for ε set to 1.5 and above population A has greater income inequality than population D; and for ε set to 2.0 population B also has greater income inequality than population C.

A complicating factor is that the Atkinson index cannot be calculated for a population containing zero incomes. Over one per cent of the SIH population has zero equivalised disposable household income including reported negative incomes which are set to zero when equivalised.

Comparison of summary measures

Table A6 provides the chosen summary measures for all years in which the SIH has been conducted, together with the standard errors of the estimates in 2002-03. In 1995-96, 1997-98 and 1999-2000 all indicators consistently pointed to an increase or a decrease in inequality. In the other years there was a mixed picture. Over the whole period, all indicators show an increase in inequality, although none of the movements are significant at the 95% confidence level. Standard errors for years prior to 2002-03 tend to be higher than those for 2002-03 because the 2002-03 SIH had a larger sample than the earlier SIHs.

A6 Summary statistics of income inequality, 1994-95 to 2002-03

	1994-95	1995-96	1996-97	1997-98	1999-2000	2000-01	2002-03 Level	2002-03 Std error
Gini coefficient	0.302	0.296	0.292	0.303	0.310	0.311	0.310	0.0037
Theil index	0.069	0.065	0.063	0.070	0.076	0.073	0.073	0.0025
Atkinson indexes(a)								
$\varepsilon = 0.5$	0.081	0.076	0.074	0.081	0.085	0.084	0.085	0.0023
$\varepsilon = 0.75$	0.127	0.118	0.115	0.126	0.132	0.131	0.133	0.0034
$\varepsilon = 1.0$	0.186	0.170	0.166	0.184	0.191	0.191	0.196	0.0052
$\varepsilon = 1.25$	0.281	0.246	0.246	0.274	0.281	0.286	0.299	0.0093
$\varepsilon = 1.5$	0.455	0.380	0.391	0.434	0.444	0.464	0.488	0.0177
$\varepsilon = 2.0$	0.902	0.807	0.834	0.850	0.871	0.913	0.914	0.0184

(a) The Atkinson indexes have been compiled using data in which zero incomes have been set to $1.

Sensitivity of summary measures to low incomes

Table A7 compares the impact on selected inequality summary statistics for the 2000-01 SIH population if persons with zero equivalised disposable household income have their income set to 1 cent, to 10 cents or to $1, or if they are omitted from the population altogether. Note that population A used in the first part of this appendix was the 2000-01 SIH population, after removing persons with zero income.

The table shows that the Atkinson indexes, but not the Gini or Theil measures, are sensitive to small changes, in dollar terms, to the lowest incomes in the Australian data set. It also shows that if persons with zero income are omitted from the population altogether, all indicators are impacted, with the least impact being on the Gini coefficient, and with an impact of over 50% on the Atkinson index with ε set to 2.0.

A7 Comparison of alternative treatments of persons with zero household income, 2000-01

	Zero income retained	Zero income set to $0.01	Zero income set to $0.10	Zero income set to $1.00	Persons with zero income omitted
Population size (million persons)	18.86	18.86	18.86	18.86	18.70
Mean equivalised disposable household income per week ($)	469	469	469	469	473
Gini coefficient	0.311	0.311	0.311	0.311	0.306
Theil index	0.073	0.073	0.073	0.073	0.069
Atkinson indexes					
$\varepsilon = 0.5$	. .	0.085	0.085	0.084	0.077
$\varepsilon = 0.75$	. .	0.135	0.134	0.131	0.116
$\varepsilon = 1.0$	. .	0.219	0.205	0.191	0.155
$\varepsilon = 1.25$	. .	0.458	0.355	0.286	0.199
$\varepsilon = 1.5$	. .	0.879	0.665	0.464	0.253
$\varepsilon = 2.0$	. .	0.997	0.977	0.913	0.452

. . not applicable

Given the likelihood that most of the very low incomes do not accurately represent the economic wellbeing of the respondents reporting such values, there is some doubt about the usefulness of summary indicators that are particularly sensitive to this segment of the population.

Choice of summary measures

There are several implicit and explicit assumptions underlying the measures discussed above. The Atkinson index explicitly requires the user to choose an 'inequality aversion' factor, but the other measures also implicitly embody judgements about how inequality is to be quantified.

Rather than considering just one summary measure, analysts will often look at a range of measures to see whether or not they give a consistent indication about changes in inequality, especially if there is no Lorenz dominance among the distributions being compared. Comparisons can be for the same population over time, or between different populations at a point in time.

Each of the indicators has its own particular advantages. For example, the Gini coefficient

can be easily understood through the graphical interpretation of the Lorenz curve, and it is probably the most widely used indicator. The Theil index is particularly useful where analysts wish to decompose the measure of income inequality in a population into the inequality that exists within subpopulations and the inequality that exists between those subpopulations. The Atkinson indexes highlight that summary measures depend on the underlying assumptions about the quantification of inequality and assist the user in varying some of those assumptions. The Gini coefficient is sometimes criticised as being too sensitive to relative changes around the middle of the income distribution. This sensitivity arises because the derivation of the Gini coefficient reflects the ranking of the population, and ranking is most likely to change at the densest part of the income distribution, which is likely to be around the middle of the distribution.

In choosing which income distribution indicators to present, whether for simple or summary measures, it is useful to recall that income alone is not a perfect measure of the economic resources available to people to maintain or enhance their wellbeing, but it is a reasonable proxy that will be suitable for most people. However, as explained in paragraph 13 of the Explanatory Notes of this publication, some respondents report extremely low and even negative incomes in the Survey of Income and Housing (SIH), often reflecting their business and investment arrangements rather than any distinctly low economic wellbeing of these respondents. In other cases, incomes may be underreported either accidentally or deliberately, so again they are not a good indicator of economic inequality. It has therefore been considered inappropriate for these records to have a disproportionate influence on a summary income inequality measure being used for assessing inequality in economic wellbeing, just as the bottom decile is excluded in this publication from analysis of low income growth over time.

The Gini has been retained in the main body of this publication because it is not overly sensitive to the extremely low incomes that can be reported, and it is relatively simple to interpret. The other summary measures looked at in this appendix are more sensitive in the Australian context to extremely low and negative incomes that are assumed to not adequately reflect economic wellbeing.

A8 LORENZ DOMINANCE BETWEEN INCOME DISTRIBUTIONS, 1994-95 TO 2002-03

Dominates		Almost dominates(a)	No dominance relationship(b)	Almost dominated by(a)	Is dominated by
	survey year	survey year	survey year	survey year	survey year
1994-95		1999-00 2000-01 2002-03	1997-98		1995-96 1996-97
1995-96	1994-95 1997-98 1999-00 2000-01 2002-03		1996-97		
1996-97	1994-95 1997-98 1999-00 2000-01 2002-03		1995-96		
1997-98	1999-00 2002-03	2000-01	1994-95		1995-96 1996-97
1999-00			2000-01 2002-03	1994-95	1995-96 1996-97 1997-98

2000-01		1999-00	1994-95	1995-96
		2002-03	1997-98	1996-97
2002-03		1999-00	1994-95	1995-96
		2000-01		1996-97
				1997-98

(a) Lorenz curves only cross in the first decile of the income distribution
(b) Lorenz curves cross at least once outside the first decile of the income distribution

Expected developments

In the 2003-04 Household Income and Expenditure Survey (a combination of the Household Expenditure Survey and the Survey of Income and Housing, currently being processed), the ABS collected additional information about the assets and liabilities of households. This wealth information, together with the reported expenditure of households, is expected to provide a better understanding of the characteristics of households with very low incomes.

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Current and Annual Income (Appendix)

APPENDIX 2 CURRENT AND ANNUAL INCOME

INTRODUCTION

The SIH produces estimates of 'current' income and estimates of full year, or annual, income with respect to the 'previous financial year'. The tables in the main body of this publication refer to 'current' income, that is, estimates of income being received at the time the data were collected from respondents. Current income provides the most up to date information available and in some cases the most accurate information available. But it also has some disadvantages. This Appendix discusses the differences in 'current' and 'annual' income measures and presents alternative estimates relating to 'previous financial year' income.

Table A10 (page 50) compares current gross income with previous financial year gross income for common reference years. For example, the previous financial year income for reference year 1995-96 is compiled from data collected in the 1996-97 SIH, whereas the current income for reference year 1995-96 is compiled from data collected in the 1995-96 SIH.

WAGE AND SALARY INCOME

For wage and salary income, table A10 shows that, for each reference year, aggregate income collected on a previous financial year basis was greater than aggregate income collected on a current basis.

Current wage and salary income relates to usual income from the last payment received by the respondent. The reference period for any individual respondent is likely to be the previous week, fortnight or month, depending on the length of the pay period for the job(s) in which the respondent is employed. The length of the reference period is collected in the survey so that the value can be scaled to a common basis such as dollars per week (as presented in tables in the main body of this publication) or dollars per year (as presented in table A10 on page 50).

If current wage or salary income contains a payment for irregular overtime worked in the previous pay period, or a pay bonus that occurs infrequently during the year, the irregular components are excluded. If such payments were included in a weekly or fortnightly pay period estimate, the recipient could appear to be receiving substantially more income annually than is likely to be the case and analysis of the respondent's economic wellbeing

would be distorted accordingly.

Excluding the extra payments from current income, on practical grounds of measurement, ignores income that does make a contribution to the economic wellbeing of the recipient. To be able to accommodate the extra payments in a current income measure would require substantial additional information about the pay period with the extra payments in it and their likely recurrence in future, as well for pay periods which have more usual or regular levels of payment so that a reasonable estimate might be made of 'current' income including an appropriate share of expected irregular payments. This is very difficult to achieve in a household interview and reporting error could be significant. By taking wage and salary income for the full preceding financial year, including irregular components received during the course of the year, wage and salary data in SIH are collected on the broader basis.

GOVERNMENT PENSIONS AND ALLOWANCES

Current government pensions and allowances also relate to income from the last payment received. Benefits are normally received fortnightly. As with wages and salaries, there are some benefit components, such as quarterly telephone allowance, that are not likely to be included in estimates of current income. They are not as significant a part of total government pensions and allowances as are the irregular components of wage and salary income. Therefore estimates of current government pensions and allowances could be expected to align more closely with previous financial year estimates.

In practice, estimates of government pensions and allowances reported on a previous financial year basis were significantly lower than estimates of government pensions and allowances reported as current income, as can be seen in table A10. The major cause of the difference appears to be higher underreporting of income received some time earlier compared to underreporting of income being received currently.

In cases where it appears likely that an individual SIH respondent has failed to report previous financial year benefits, previous year benefit income is imputed. For example, where a respondent has reported receiving a current benefit such as age pension, is of an age that would qualify for the age pension in the previous year, and that person has not reported receiving significant income from other sources in the previous financial year, it can be assumed that they probably would have also received the age pension in the previous financial year. In such cases, previous financial year age pension has been imputed on the basis of the amount reported as current income, adjusting for benefit rate changes over the previous 12 months.

However, imputation for previous year benefit income, based on likely ongoing entitlement, is not possible for benefits such as Newstart or youth allowance, and table A10 indicates that, in aggregate, previous financial year income falls short of current income after the implementation of the imputation procedure described in the previous paragraph.

OWN UNINCORPORATED BUSINESS INCOME

Estimates of current income from own unincorporated business are quite different in nature

to the estimates of current income for the two income sources discussed above.

The concept of business income is a net concept. It is the profit or loss derived by deducting operating expenses (including depreciation) from the value of gross output. In the past, many unincorporated businesses did not calculate profit and loss data more than once a year, and for many businesses there are revenues earned or costs incurred only infrequently during the year. Hence SIH respondents have not been able to provide a value of current business income distinct from the value of business income received in the previous financial year.

Therefore a respondent is only deemed to have current own unincorporated business income if they had such income in the previous year and they are still operating the business. The current income value is defined to be the same amount as the previous year income, scaled up to a full year basis if the business only operated for part of the previous year. Thus it is assumed that the business will have the same monthly profit or loss in the current year as it did in the previous financial year. This is particularly problematic with businesses which only commenced operating toward the end of the previous year, especially if they made a loss in their first months of operation. Also, there is no current income estimate for businesses which only commenced operations in the current year.

INVESTMENT INCOME

Investment income includes interest and dividend income received as a result of the ownership of financial assets, and rent and royalty income received from the ownership of non-financial assets. As for own unincorporated business income, only previous financial year income data are collected from SIH respondents. Current income from dividends from own incorporated businesses is derived from reported previous financial year data in the same way as current own unincorporated business income, as discussed above. Current income from other forms of investment is derived by simply assuming that current income is equal to previous financial year income.

The rent component of investment income is measured on a net basis, that is, gross rent less operating expenses. The other components, for which associated expenses are normally relatively small, are on a gross basis.

OTHER INCOME

The remaining income sources include superannuation, child support, workers' compensation and scholarships. These are collected both on a current basis and on a previous financial year basis.

COMPARISON OF ESTIMATES

There are two major advantages of the current income estimates compared to previous financial year income estimates. First, they are more up to date for wages and salaries, for government cash benefits and for 'other' income (as defined in the preceding paragraph),

which together accounted for 86% of total current income in 2002-03. Second, they appear to be more accurately reported for government cash benefits, and may also be more accurately reported for those elements of wages and salaries that are included in current income and for 'other' income.

On the other hand, the previous financial year estimates have the major conceptual advantage of being annual estimates with more complete coverage of income components. They have a longer time perspective, which while allowing short-term fluctuations in income to have an influence, do not allow short-term situations to potentially dominate the measure being compiled. If a short-term fluctuation has an undue influence on a current income measure, the measure is not a good indicator of underlying economic wellbeing. Short-term fluctuations may be positive or negative, for example, salary bonuses compared to low income or even nil income during short periods of unemployment.

The previous financial year income estimates also have the attraction of being internally consistent with respect to the time periods to which the underlying income data relate. The current income estimates are compiled from a mix of data collected on a current basis and on a previous financial year basis.

However, this internal consistency does not extend to other aspects of the data. The composition of the household, employment status of members of the household, etc., all relate to the current period. If the composition of the household has changed, previous financial year household income estimates in effect relate to a quasi household. In many cases this will not have a marked effect on the data. If, for example, an additional adult joined the household, their previous financial year income will be included in total 'household' income for the previous financial year, but their presence will be reflected in the household composition data that are used for calculating the equivalising factor for that previous year, muting the impact of the artificially inflated previous year income for the household.

However, the issues in analysis due to household composition changing between the previous and current years can be more marked. For example, for households with new members that do not have previous financial year income recorded in SIH, due to being out of scope at that time (perhaps overseas), their previous financial year income does not contribute to the previous financial year income compiled for the household. But their presence is reflected in the equivalising factor applied to the income of the rest of the household, resulting in an underestimate of equivalised income of the household. Similarly, a household may have had an additional member in the previous year and that person provided the bulk of the income for the household. But since SIH can only include the previous financial year income of the household members remaining at the time of interview, the household may incorrectly appear to have had very low income in the previous year, perhaps well below the levels which would have entitled members to social security benefits. While it is possible to omit such households from income distribution calculations, that has not been done for the tables included in this appendix.

Table A11 provides income distribution indicators compiled from previous financial year data. It provides alternative estimates to the current income estimates provided in table 1 in the main body of this publication. Comparisons can be made between the two tables for the reference periods 1994-95 to 1999-2000, and a summary is given in the following table, A9.

A9 SELECTED INCOME DISTRIBUTION INDICATORS, Equivalised disposable household income

		Current income basis			Previous financial year basis			
		1994-95	1999-2000	% change	1994-95	1999-2000	% change	Difference in % change
Mean income per week, in 2000-01 dollars								
Low income(a)	$	227	241	6.4	230	249	8.2	1.8
High income(b)	$	792	879	10.9	807	917	13.7	2.8
Income shares								
Low income(a)	%	10.8	10.5	-2.3	10.7	10.5	-2.5	-0.2
High income(b)	%	37.8	38.4	1.6	37.7	38.6	2.5	0.8
Percentile ratios								
P90/P10	ratio	3.77	3.89	3.1	3.90	4.06	4.3	1.2
P80/P20	ratio	2.56	2.64	3.4	2.63	2.64	0.6	-2.7
Gini coefficient	no.	0.302	0.310	2.8	0.302	0.313	3.6	0.8

(a) Persons in the 2nd and 3rd income deciles after being ranked by their equivalised disposable household income
(b) Persons in the top income quintile (9th and 10th deciles) after being ranked by their equivalised disposable household income

The previous financial year estimates show stronger growth in real incomes between 1994-95 and 1999-2000 for both the high income and the low income groups, with greater additional growth in the high income group. The P80/P20 ratio derived from previous financial year estimates shows less increase in inequality than the ratio derived from current income estimates (0.6% compared to 3.4% respectively). However, for all the other distribution indicators, the opposite is the case. For example, the Gini coefficient is 0.302 in 1994-95 on both a previous financial year basis and a current basis. However, the previous financial year income based coefficient rose to 0.313 in 1999-2000, while the current income based coefficient rose to 0.310.

FUTURE DEVELOPMENTS

The ABS is taking steps to improve the quality of both current and previous financial year estimates.

The focus for current estimates is to get more up to date information of own unincorporated business income. However, because of the nature of business income, the underlying concept would still be an annual one. The information collected would relate to the likely business income outcome of the respondent in the year in which the survey is being conducted, to avoid issues such as imputing ongoing losses in start up situations. Changed record keeping practices by businesses following the introduction of The New Tax System in July 2000 are expected to be of assistance to respondents in providing relevant information for this purpose.

The ABS is also exploring ways of using computer assisted interviewing tools during the SIH interview to better identify those respondents who appear to be providing incomplete previous financial year data.

A10 Current and Previous financial year gross income(a)

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
	$ billion	$ billion	$ billion	$ billion	$ billion	$ billion	$ billion	$ billion	$ billion	$ billion
Wages and salaries										
Current income	na	194.7	199.3	211.6	223.6	na	251.1	268.3	na	308.4
Previous financial year income(b)	194.7	204.4	219.1	232.2	na	257.7	277.0	na	311.2	na
Government cash benefits										
Current income	na	34.3	36.5	38.6	39.0	na	41.2	46.5	na	49.6
Previous financial year income(b)	30.7	32.8	34.9	36.2	na	37.7	40.5	na	44.6	na
Own unincorporated business income										
Current income	na	18.8	23.2	21.4	23.6	na	28.7	27.7	na	33.2
Previous financial year income(b)	18.5	22.8	22.5	24.4	na	27.5	25.9	na	31.3	na
Investment income										
Current income	na	10.7	10.9	14.4	13.2	na	17.3	16.3	na	16.2
Previous financial year income(b)	10.9	11.0	14.3	13.0	na	17.3	15.7	na	16.6	na
Other income										
Current income	na	7.2	7.9	8.2	9.9	na	10.5	11.7	na	15.1
Previous financial year income(b)	6.6	7.0	7.5	8.4	na	8.5	9.7	na	13.1	na
Total income										
Current income	na	265.8	277.8	294.3	309.3	na	348.9	370.5	na	422.5
Previous financial year income(b)	261.4	278.0	298.4	314.2	na	348.7	368.8	na	416.9	na

na not available
(a) Historic data in the table are not adjusted for changes in the CPI
(b) Compiled from data collected in the SIH of the year following the reference year

A11 Income distribution indicators, Previous financial year income(a)

Person weighted indicator		1993-94	1994-95	1995-96	1996-97	1998-99	1999-2000	2001-02
Mean income per week(b)								
Lowest quintile	$	169	177	182	183	188	190	188
Second quintile	$	290	293	297	295	318	318	331
Third quintile	$	406	403	409	413	448	444	461
Fourth quintile	$	542	542	546	558	600	595	619
Highest quintile	$	847	856	870	894	964	973	989
All persons	$	451	454	461	469	503	504	518
Second and third deciles	$	240	243	248	246	262	264	270
Income per week at top of selected percentiles(b)								
10th (P10)	$	194	198	202	203	212	213	215
20th (P20)	$	237	242	249	246	259	263	267
30th (P30)	$	290	293	296	294	318	315	329
40th (P40)	$	346	345	350	349	379	376	397
50th (P50)	$	406	403	409	413	447	445	459
60th (P60)	$	466	468	469	478	521	515	533
70th (P70)	$	533	538	544	555	596	592	617
80th (P80)	$	634	635	632	645	696	695	720
90th (P90)	$	776	772	773	791	849	866	876
Income share								
Lowest quintile	%	7.5	7.8	7.9	7.8	7.5	7.5	7.3
Second quintile	%	12.9	12.9	12.9	12.6	12.6	12.6	12.8
Third quintile	%	18.0	17.8	17.7	17.6	17.8	17.6	17.8
Fourth quintile	%	24.0	23.9	23.7	23.8	23.8	23.6	23.9

Highest quintile	%	37.6	37.7	37.8	38.2	38.3	38.6	38.2
All persons	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Second and third deciles	%	10.6	10.7	10.8	10.5	10.4	10.5	10.4
Ratio of incomes at top of selected income percentiles								
P90/P10	ratio	4.00	3.89	3.82	3.89	4.00	4.06	4.08
P80/P20	ratio	2.68	2.63	2.54	2.63	2.68	2.64	2.70
P80/P50	ratio	1.56	1.58	1.55	1.56	1.56	1.56	1.57
P20/P50	ratio	0.58	0.60	0.61	0.60	0.58	0.59	0.58
Gini coefficient	no.	0.304	0.302	0.303	0.308	0.312	0.313	0.312

(a) Compiled from data collected in the SIH of the year following the reference years. Income is equivalised disposable household income
(b) In 2002-03 dollars, adjusted using changes in the Consumer Price Index

Equivalised Disposable Household Income (Appendix)

APPENDIX 3 EQUIVALISED DISPOSABLE HOUSEHOLD INCOME

EQUIVALENCE SCALES

Equivalence scales have been devised to make adjustments to the actual incomes of households in a way that enables analysis of the relative wellbeing of households of different size and composition. For example, it would be expected that a household comprising two people would normally need more income than a lone person household if the two households are to enjoy the same standard of living.

One way of adjusting for this difference in household size might be simply to divide the income of the household by the number of people within the household so that all income is presented on a per capita basis. However, such a simple adjustment assumes that all individuals have the same resource needs if they are to enjoy the same standard of living and that there are no economies derived from living together.

Various calibrations, or scales, have been devised to make adjustments to the actual incomes of households in a way that recognises differences in the needs of individuals within those households and the economies that flow from sharing resources. The scales differ in their detail and complexity but commonly recognise that the extra level of resources required by larger groups of people living together is not directly proportional to the number of people in the group. They also typically recognise that children have fewer needs than adults.

When household income is adjusted according to an equivalence scale, the equivalised income can be viewed as an indicator of the economic resources available to a standardised household. For a lone person household it is equal to household income. For a household comprising more than one person, it is an indicator of the household income that would need to be received by a lone person household to enjoy the same level of economic wellbeing as the household in question.

Alternatively, equivalised household income can be viewed as an indicator of the economic resources available to each individual in a household. The latter view underpins the calculation of income distribution measures based on numbers of people, rather than numbers of households.

CHOICE OF SCALE

While there has been considerable research by statistical and other agencies trying to estimate appropriate values for equivalence scales, no single standard has emerged. In theory, there are many factors which might be taken into account when devising equivalence scales, such as recognising that people in the labour force are likely to face transport and other costs that can affect their standard of living. It might also be desirable to reflect the different needs of children at different ages, and the different cost levels faced by people living in different geographic areas. On the other hand, the tastes and preferences of people vary widely, resulting in markedly different expenditure patterns between households with similar income levels and similar composition. Furthermore, it is likely that equivalence scales that appropriately adjust incomes of low income households are not as appropriate for higher income households, and vice versa. This is because the proportion of total income spent on housing tends to fall as incomes rise, and cheaper per capita housing is a major source of economies of scale that flow from people living together.

It is therefore difficult to define, estimate and use equivalence scales which take all relevant factors into account. As a result, analysts tend to use simple equivalence scales which are chosen subjectively but are nevertheless consistent with the quantitative research that has been undertaken. A major advantage of simpler scales is that they are more transparent to the user, that is, it is easier to evaluate the assumptions being made in the equivalising process.

In this publication, the 'modified OECD' equivalence scale is used. The 'modified OECD' equivalence scale has been used in more recent research work undertaken for the OECD, has wide acceptance among Australian analysts of income distribution, and is the stated preference of key SIH users.

DERIVATION OF EQUIVALISED INCOME

Equivalised income is derived by calculating an equivalence factor according to the chosen equivalence scale, and then dividing income by the factor.

The equivalence factor derived using the 'modified OECD' equivalence scale is built up by allocating points to each person in a household. Taking the first adult in the household as having a weight of 1 point, each additional person who is 15 years or older is allocated 0.5 points, and each child under the age of 15 is allocated 0.3 points. Equivalised household income is derived by dividing total household income by a factor equal to the sum of the equivalence points allocated to the household members. The equivalised income of a lone person household is the same as its unequivalised income. The equivalised income of a household comprising more than one person lies between the total value and the per capita value of its unequivalised income.

Equivalised household income is an indicator of the economic resources available to each member of a household. It can therefore be used for comparing the situation of individuals as well as comparing the situation of households.

When unequivalised income is negative, such as when losses incurred in a household's unincorporated business or other investments are greater than any positive income from any other sources, then equivalised income has been set to zero.

GROSS INCOME AND EQUIVALISED DISPOSABLE INCOME

The SIH collects data on households' gross income. However, disposable income, that is, gross income less the value of income tax and Medicare levy to be paid on the gross income, is a better indicator of the resources available to a household to maintain its standard of living. Therefore, for this publication, estimates of income tax payable on gross income reported in the SIH are made by means of a tax model. The tax and Medicare estimates are subtracted from gross income to give disposable income, and the equivalence factors are applied to the estimates of disposable income. Person weighted measures of income distribution are then derived from the estimates of equivalised disposable household income. (Appendix 1 describes the difference between person weighted and household weighted measures.)

Means and medians of both gross income and equivalised disposable income are shown in some tables in this publication to allow users to see the differences between data as collected and data as standardised to facilitate income distribution analysis. The following table shows the differences in income measures when calculated from data at different stages in the progression from gross household income to person weighted equivalised disposable household income.

A12 From gross income to person weighted equivalised disposable income

		Gross household income per week	Income tax per week	Disposable household income per week	EQUIVALISED DISPOSABLE HOUSEHOLD INCOME PER WEEK	
					Household weighted	Person weighted
Percentile boundaries and percentile ratios						
P10	$	226	na	225	211	218
P20	$	361	na	355	247	267
P50	$	850	na	722	436	448
P80	$	1,600	na	1,268	717	702
P90	$	2,119	na	1,626	893	870
P90/P10	ratio	9.38	na	7.23	4.24	4.00
P80/P20	ratio	4.43	na	3.57	2.90	2.63
Means						
All households	$	1,061	210	851	506	510
Household composition						
Couple, one family households						

Couple only	$	1,069	212	856	573	573
Couple with dependent children only	$	1,359	305	1,053	491	481
Other couple, one family households	$	1,762	347	1,415	603	591
One parent, one family households with dependent children	$	687	83	604	357	352
Other family households	$	1,235	216	1,019	535	532
Non-family households						
Lone person	$	524	93	431	432	432
Group households	$	1,253	236	1,016	616	621

na not available

The first column in table A12 above shows measures calculated from gross household income, as collected in the SIH. The next column shows estimates of income tax to be paid on gross income, with the third column giving the resultant disposable household income.

Individuals with higher incomes will normally be expected to pay higher income tax than individuals with lower incomes, but this relationship is not as strong for households. A household with relatively high income may comprise only one individual with high income or it may include a number of individuals with relatively low income. The disposable income in the first situation will be lower than that in the second situation, and will result in a reranking of the households in the formation of percentiles. Therefore a household may fall into a different percentile in an analysis of disposable income compared to an analysis of gross income.

As would be expected, the difference between disposable income and gross income increases as income levels increase. At the upper boundary of the tenth percentile (P10), there is no difference at all, that is, the income tax to be paid by households with the lowest levels of gross income is negligible. In contrast, there is nearly $500 per week difference between the P90 value for gross household income and the P90 value for disposable household income.

The fourth and fifth columns of the table show measures calculated from equivalised disposable household income. When household weighted, the percentiles and means are calculated with respect to the numbers of households concerned. When person weighted, they are calculated with respect to the numbers of people within households. While the ranking underlying the formation of percentiles is the same for the two income measures, the boundaries between the percentiles differ because household weighted percentile boundaries create subgroups with equal numbers of households while person weighted percentile boundaries create subgroups with equal numbers of persons. The extent to which the boundaries differ reflects the extent to which the average household size differs between percentiles.

The person weighted estimate of P10 ($218) is slightly higher than the household weighted estimate of P10 ($211). This implies that the households with the lowest rankings of equivalised disposable household income tend to comprise a lower than average number of persons. In other words, the 10% of people with the lowest income make up slightly more than the 10% of households with the lowest income.

For lone person households, the two measures of equivalised disposable income are the same as each other ($432) and are just a little higher than disposable income ($431). Equivalised disposable income for lone person households is approximately the same as disposable income, because the equivalising factor for such households is 1.0. The reason for the slight difference between them is that some households have negative disposable income and their values are reset to zero before equivalising is carried out.

For all other types of household composition, equivalised disposable income is lower than disposable income, since income is adjusted to reflect household size and composition. Mean equivalised disposable income for couple only households is the same for both the household weighted and the person weighted measures since there are always two and only two persons in such households. For most other multi-person households, person weighted mean income is lower than the household weighted mean. This implies that, within each type, larger households tend to have lower equivalised household income.

Sampling Variability (Appendix)

APPENDIX 4 SAMPLING VARIABILITY

INTRODUCTION

The estimates in this publication are based on information obtained from the occupants of a sample of dwellings. Therefore, the estimates are subject to sampling variability and may differ from the figures that would have been produced if information had been collected for all dwellings. One measure of the likely difference is given by the standard error (SE), which indicates the extent to which an estimate might have varied because only a sample of dwellings was included. There are about two chances in three that the sample estimate will differ by less than one SE from the figure that would have been obtained if all dwellings had been included, and about 19 chances in 20 that the difference will be less than two SEs. Another measure of the likely difference is the relative standard error (RSE), which is obtained by expressing the SE as a percentage of the estimate.

For estimates of population sizes, the size of the SE generally increases with the level of the estimate, so that the larger the estimate the larger the SE. However, the larger the sampling estimate the smaller the SE in percentage terms (RSE). Thus, larger sample estimates will be relatively more reliable than smaller estimates.

In the tables in this publication, only estimates with RSEs of 25% or less are considered reliable for most purposes. Estimates with RSEs greater than 25% but less than or equal to 50% are preceded by an asterisk (e.g. *3.4) to indicate they are subject to high SEs and should be used with caution. Estimates with RSEs of greater than 50%, preceded by a double asterisk (e.g. **0.3), are considered too unreliable for general use and should only be used to aggregate with other estimates to provide derived estimates with RSEs of 25% or less.

Space does not allow for the separate indication of the SE of all the estimates in this

publication. RSEs for all tables are provided on this web site, with the RSEs for table 1 also included as table A13. The RSEs have been derived using the group jackknife method.

RSES OF COMPARATIVE ESTIMATES

Proportions and percentages

Proportions and percentages, which are formed from the ratio of two estimates, are also subject to sampling errors. The size of the error depends on the accuracy of both the numerator and the denominator. For proportions where the denominator is an estimate of the number of households in a grouping and the numerator is the number of households in a sub-group of the denominator group, the formula for the RSE is given by

$$RSE\%\left(\frac{x}{y}\right) = \sqrt{[RSE\%(x)]^2 - [RSE\%(y)]^2}$$

Differences between estimates

The difference between survey estimates is also subject to sampling variability. An approximate SE of the difference between two estimates (x-y) may be calculated by the formula:

$$SE(x - y) = \sqrt{[SE(x)]^2 + [SE(y)]^2}$$

This approximation can generally be used whenever the estimates come from different samples, such as two estimates from different years or two estimates for two non-intersecting subpopulations in the one year. If the estimates come from two populations, one of which is a subpopulation of the other, the standard error is likely to be lower than that derived from this approximation, but there is no straightforward way of estimating how much lower.

A13 Relative standard errors (%) for table 1, Income distribution

Person weighted indicator	1994-95 %	1995-96 %	1996-97 %	1997-98 %	1999-2000 %	2000-01 %	2002-03 %
Mean income per week							
Lowest quintile	1.5	1.0	1.7	1.3	1.6	1.5	1.3
Second quintile	0.9	0.6	0.8	0.8	0.9	1.0	0.7
Third quintile	1.0	0.9	0.6	0.7	1.0	0.7	0.8
Fourth quintile	0.6	0.9	0.7	0.6	1.0	0.8	0.6
Highest quintile	1.3	0.9	1.1	1.4	2.0	1.6	1.2
All persons	0.7	0.6	0.6	0.6	1.1	0.8	0.7
Second & third decile	0.7	0.8	0.8	1.0	1.1	1.0	0.8
Income per week at top of selected percentiles							
10th (P10)	0.8	1.1	1.1	0.8	1.0	1.0	0.8
20th (P20)	1.0	0.7	1.0	0.9	1.3	1.2	1.1
30th (P30)	1.1	0.8	0.9	0.6	1.0	1.2	0.8
40th (P40)	1.1	0.6	1.0	1.0	1.4	0.8	0.7
50th (P50)	1.0	1.2	0.6	1.0	1.2	0.9	0.8
60th (P60)	0.8	1.0	0.9	0.6	1.2	0.8	0.7
70th (P70)	0.7	1.0	0.9	0.7	1.0	0.7	0.7
80th (P80)	0.9	0.9	0.9	1.0	1.1	1.2	0.7

	90th (P90)	0.9	0.8	1.1	0.8	1.3	1.1	0.8
Income share								
	Lowest quintile	1.4	1.0	1.6	1.4	1.5	1.4	1.2
	Second quintile	0.7	0.6	0.7	0.8	0.8	0.9	0.7
	Third quintile	0.6	0.6	0.6	0.8	0.6	0.8	0.7
	Fourth quintile	0.6	0.6	0.6	0.5	0.9	0.6	0.5
	Highest quintile	0.8	0.6	0.7	0.9	1.1	1.0	0.7
	All persons	-	-	-	-	-	-	-
	Second & third decile	0.8	0.8	0.8	0.8	1.0	0.9	0.8
Ratio of incomes at top of selected income percentiles								
	P90/P10	1.5	1.9	1.7	1.4	1.9	1.5	1.3
	P80/P20	1.2	1.2	1.7	1.5	1.8	1.9	1.1
	P80/P50	0.9	1.3	1.3	1.6	1.1	1.4	0.8
	P20/P50	1.2	1.3	1.2	1.4	1.5	1.8	1.3
Gini coefficient		1.2	0.9	1.2	1.4	1.5	1.4	1.1

- nil or rounded to zero (including null cells)